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JULY/AUGUST 2005

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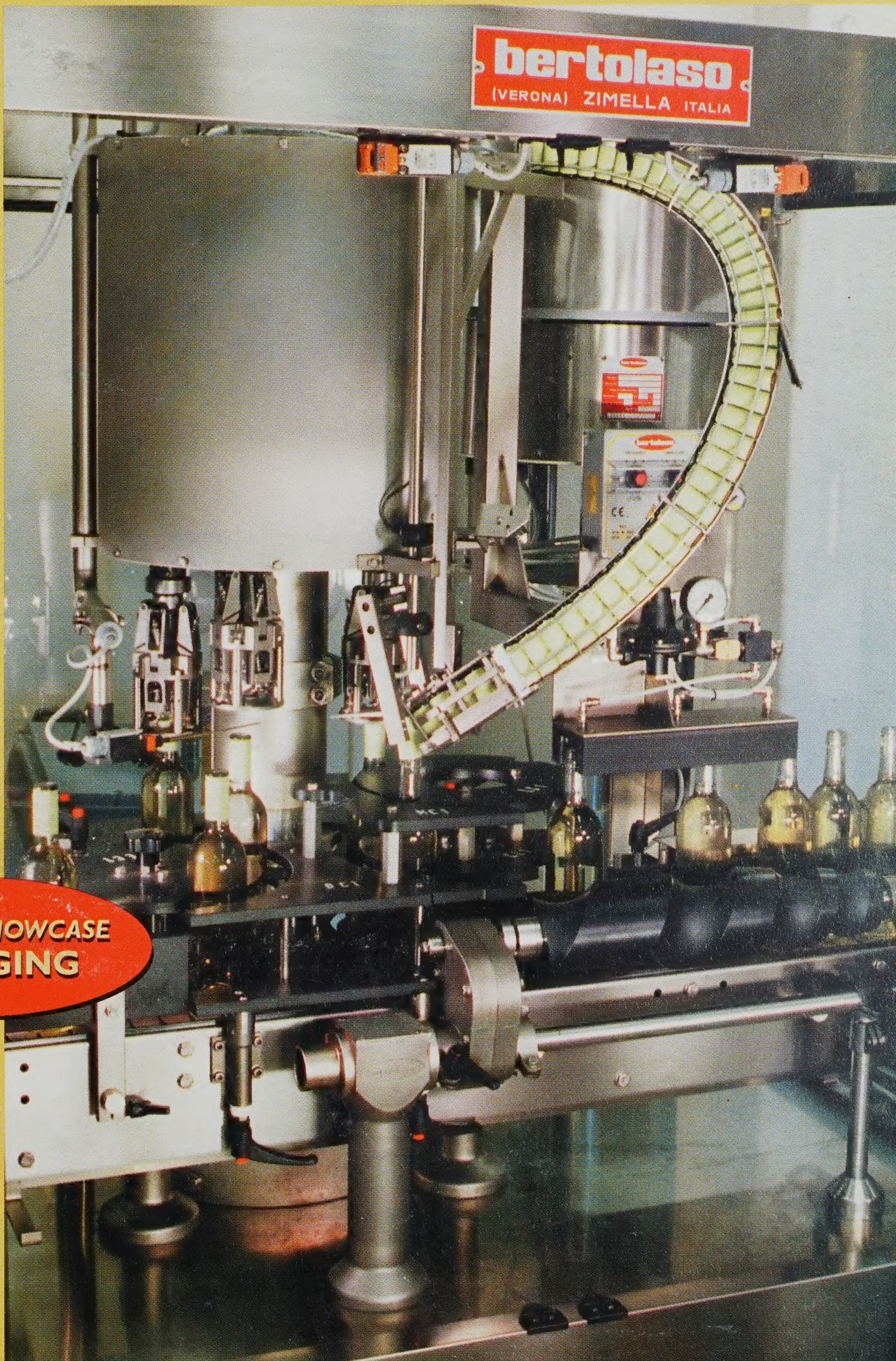

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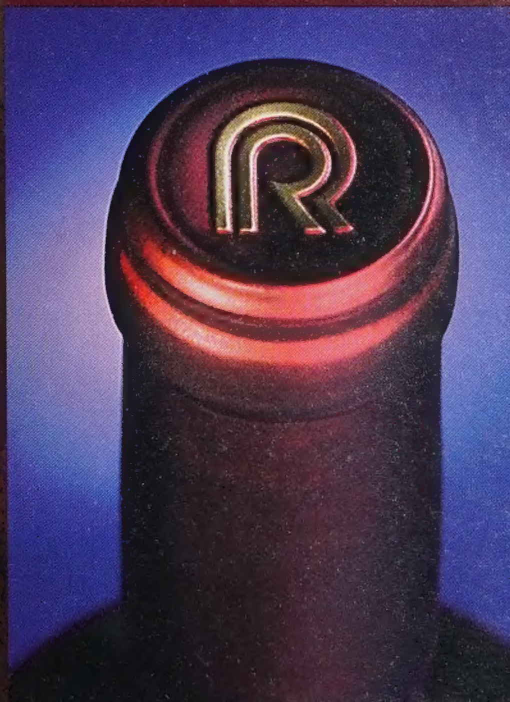

PRACTICAL WINERY & VINEYARD

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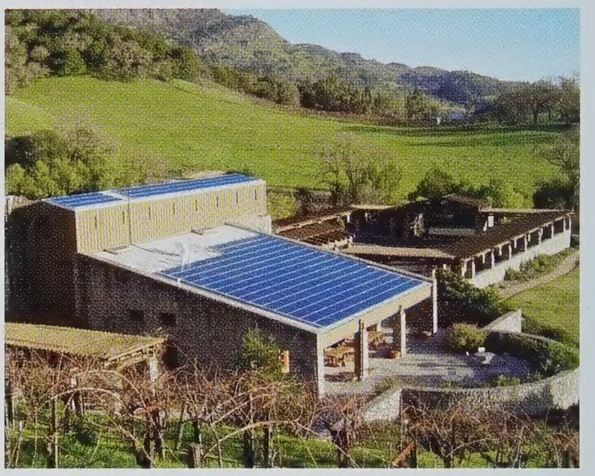

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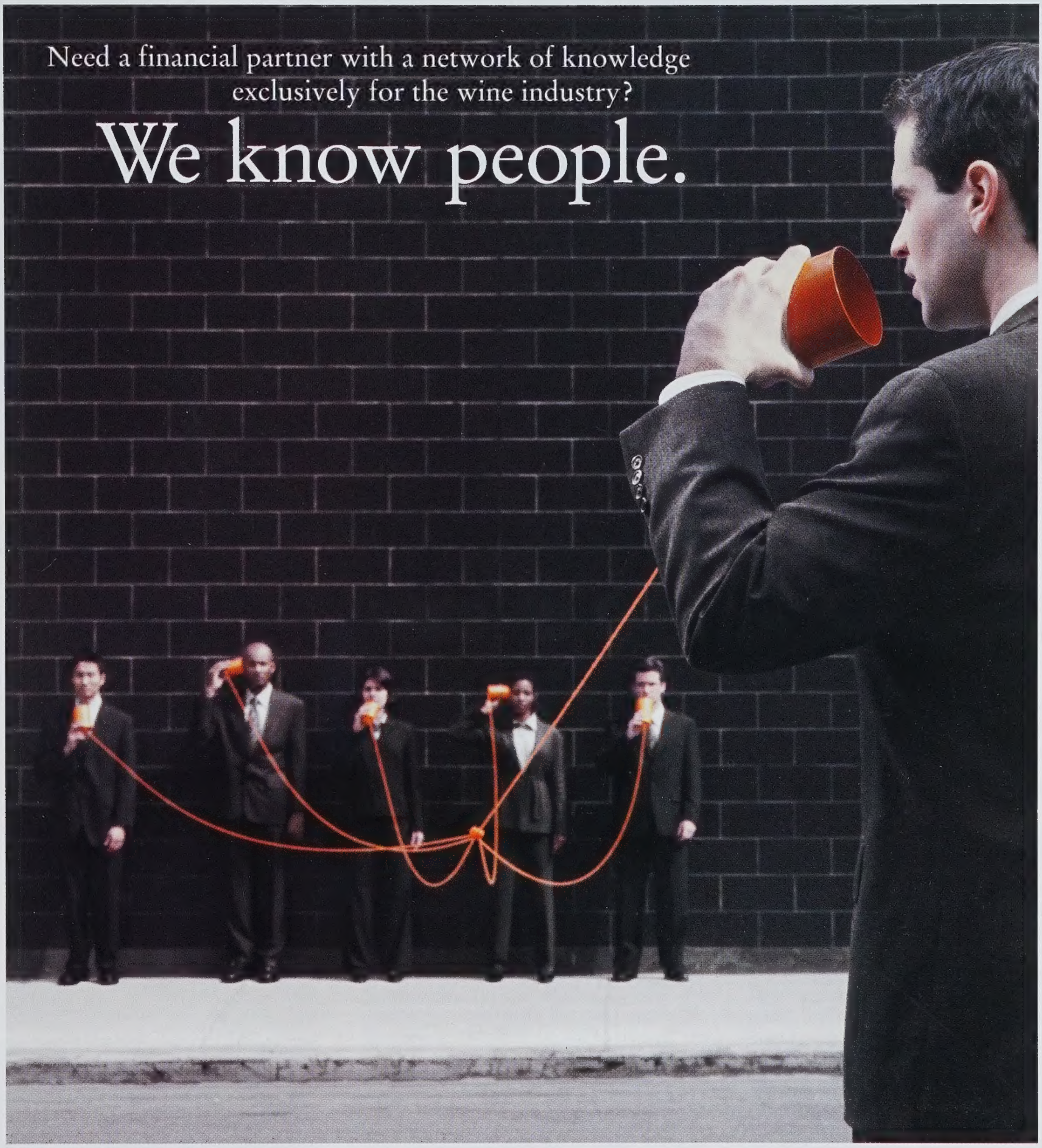
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The most obvious symptom of grapevine leafroll disease, which is common in grape-growing regions worldwide, is reddening and curling of leaves in the fall on dark-fruited varieties.

Mealybugs and grapevine leafroll disease

BY Deborah A. Golino, Susan T. Sim, Raymond Gill, Adib Rowhani
Foundation Plant Service, UC Davis

Grapevine leafroll disease occurs in all the major grapegrowing regions of the world, causing reductions in productivity and in the quality of both wine and table grapes. The most obvious symptom of the disease occurs in the autumn in dark-fruited varieties, which develop a strong red leaf color. In lighter fruited varieties, a general chlorosis will develop. Often, leaf margins turn under and roll downward, hence the disease name "leafroll."

Growers are most concerned with reduced yields, delayed maturity, and poor pigmentation. Some studies estimate yield losses of as much as 30% to 40%. In addition, the disease agent has been implicated in certain types of graft incompatibility and young vine failure.

The most successful approach to controlling leafroll disease in grapevines has been the use of disease-tested grapevine nursery stock produced through the California Grapevine Registration and Certification Program, a program administered by the California Department of Food and Agriculture.

The Foundation Plant Service's clean stock program for grapes was one of the first in the world, created during the 1950s.[1] The program was originally managed under the assumption that grapevine leafroll viruses spread only by grafting healthy stock with infected stock and did not spread naturally in vineyards.[4] This was based on many years of observation by scientists that leafroll disease had been rarely recorded to spread between vines in California vineyards. Hence, healthy and diseased vines were planted in the same location in many of the older blocks.

The first evidence of leafroll disease was discovered in the FPS vineyard at UC Davis in 1992,[14] using the recently developed leafroll virus serological test, an enzyme-linked immunoabsorbent assay (ELISA).[6] It became clear that more research was needed on how and when leafroll was spread between grapevines. Previously, scientists had observed the natural spread of leafroll disease and had implicated mealybugs as putative vectors.[3,7,8,15,16] It was possible that this was a mechanism for spread in California vineyards also.

Experiments were begun to determine whether the mealybug species found in California vineyards could transmit domestic isolates of leafroll under experimental conditions.

Four species of mealybug found commonly in California vineyards were selected: longtailed mealybug, *Pseudococcus longispinus* (Targioni-Tozzetti); obscure mealybug, *Pseudococcus viburni* (Signoret); grape mealybug, *Pseudococcus maritimus* (Ehrhorn); and citrus mealybug, *Planococcus citri* (Risso).

Two of the four mealybug species already had been reported to have vector potential: longtailed mealybug was reported to transmit leafroll disease agents in 1989,[15] and citrus mealybug was reported to transmit grapevine virus A.[11] Neither obscure nor grape mealybug had yet been shown to transmit leafroll disease agents or any of the other grapevine closteroviruses. They were strong candidates for testing since they are widespread on grapevines in California.

The authors are affiliated with the UC Davis Foundation Plant Service (FPS), which maintains a disease-tested, professionally-identified collection of grape scion and rootstock varieties. This collection is the core of the California Grapevine Registration and Certification Program. In 1992, newly developed serological testing techniques revealed the presence of grapevine leafroll–associated viruses (GLRaVs) in previously healthy vines in an older foundation propagating block, indicating active and recent virus spread. FPS responded by increasing isolation distances and implementing a comprehensive virus-screening program using new methodology.

The critical problem was the lack of information on leafroll virus epidemiology. When the distribution of infected plants in the old vineyard was mapped, new infections were frequently adjacent to known diseased grapevines. This study examined the ability of mealybugs, a putative leafroll vector, to transmit this group of viruses.

Our FPS research staff was able to confirm that four mealybug species found in California — obscure, longtailed, citrus, and grape — can transmit GLRaV-3 isolates. This was the first experimental evidence of grapevine leafroll virus transmission by obscure and grape mealybug. In addition, we reported, for the first time, that GLRaV-5 can be transmitted by the longtailed mealybug.

The authors determined that all four mealybug species can transmit grapevine leafroll disease via feeding. *Above*, Cabernet Franc vines developed severe leafroll systems after infected longtailed mealybug fed on them.

Establishing populations

All mealybug species were identified by co-author Raymond Gill (a pseudococcid taxonomist). Obscure and longtailed mealybug were collected from a vineyard in San Luis Obispo, with the help of UC farm advisor Mary Bianchi. Kent Daane, UC Berkeley extension assistant specialist, supplied the citrus mealybug.

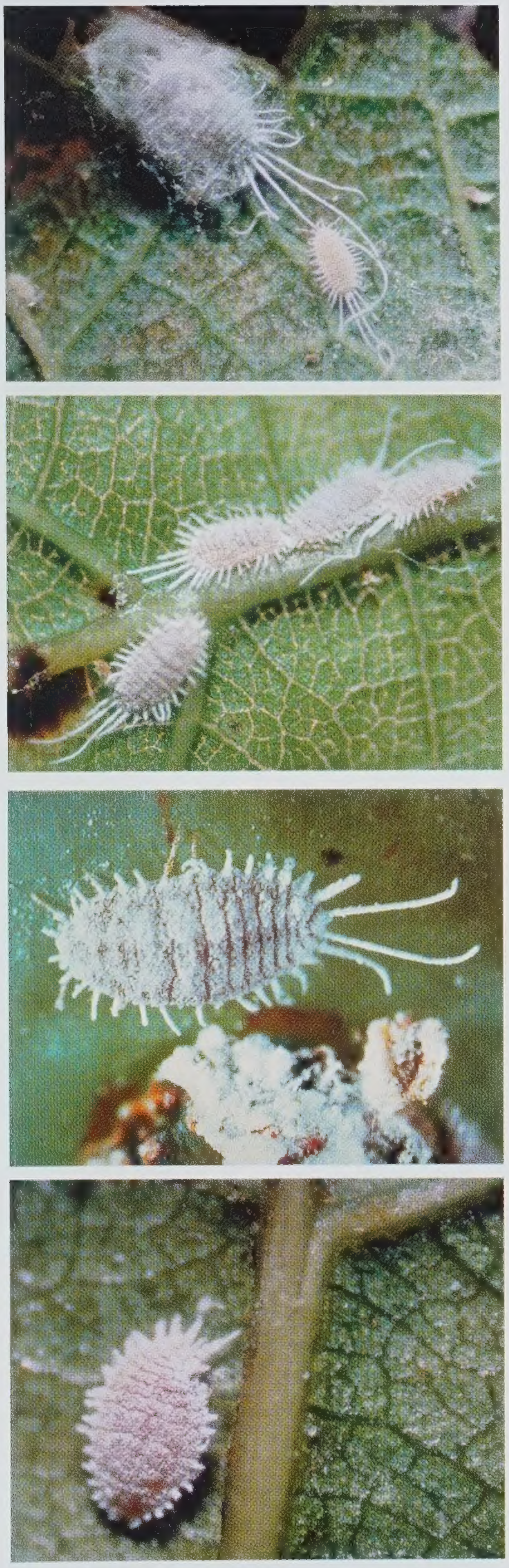
For all these cultures, single females were isolated and allowed to reproduce, assuring that the established culture contained only a single species. This was essential because mealybug species are often found as mixed populations, as was the case in the San Luis Obispo collection.

Mealybug cultures were maintained for several years on sprouted organic potatoes in quart glass jars. They were then covered with 16XX silk-screen cloth secured with a lid band to which a caulk seal had been applied. The jars were maintained at room temperature under fluorescent lights with a 14-hour day and 8-hour dark period. We found that populations readily adapted to experiments on grapevines if they were reared on that host for at least one generation or so. As needed, populations were moved from potatoes to grapevines caged in greenhouses.

Grape mealybug was collected from a Napa Valley vineyard. This species cannot be raised reliably in the laboratory; therefore, field-collected insects were used for the experiments. This population was checked to ensure that they were initially free of virus when collected from the field by screening on healthy plants and ELISA-testing of mealybugs.

Leafroll from virus collection

Reference sources of leafroll and other grape virus diseases were established in the UC Davis grapevine virus



Four species of mealybug that are commonly found in California vineyards were selected for experiments on transmission of leafroll diseases: *top to bottom*, longtailed mealybug (female) and nymph with long, taillike filaments; obscure mealybug; grape mealybug, which is commonly found on grape berries, as shown; and citrus mealybug, with characteristic short, wedge-shaped filaments.

Will vine mealybug transmit leafroll?

BY Deborah A. Golino

Vine mealybug, *Planococcus ficus*, is a newcomer to California. First discovered in the Cochella Valley in the late 1990s, it has slowly spread north throughout California. It was not included in the mealybug leafroll virus study reported here because, at the time, containment efforts were still in full force and it was not possible (nor prudent) to obtain colonies of the insect for the studies which were conducted at UC Davis.

Unfortunately, it is our expectation that vine mealybug will be a very efficient vector of leafroll virus in California. In the late 1980s, vine mealybug was the first species of mealybug reported in the international literature to transmit leafroll virus. In fact, the very rapid spread of leafroll disease in South Africa is attributed largely to the vine mealybug.

All grape growers in California are concerned about the rapid expansion of the range of vine mealybug in the state. This is a serious pest which is difficult to control. Its efficiency as a leafroll vector is one more reason that efforts to manage this insect are critical. ■

collection.[5] This collection is essential to our studies since many grape viruses cannot easily be purified, stored or transmitted to smaller, easy-to-grow plants.

Leafroll disease is associated with a group of closely related viruses, all in the closterovirus group, known as grapevine leafroll–associated viruses (GLRaV), which are numbered sequentially in the order of their discovery (GLRaV-1 through GLRaV-7).

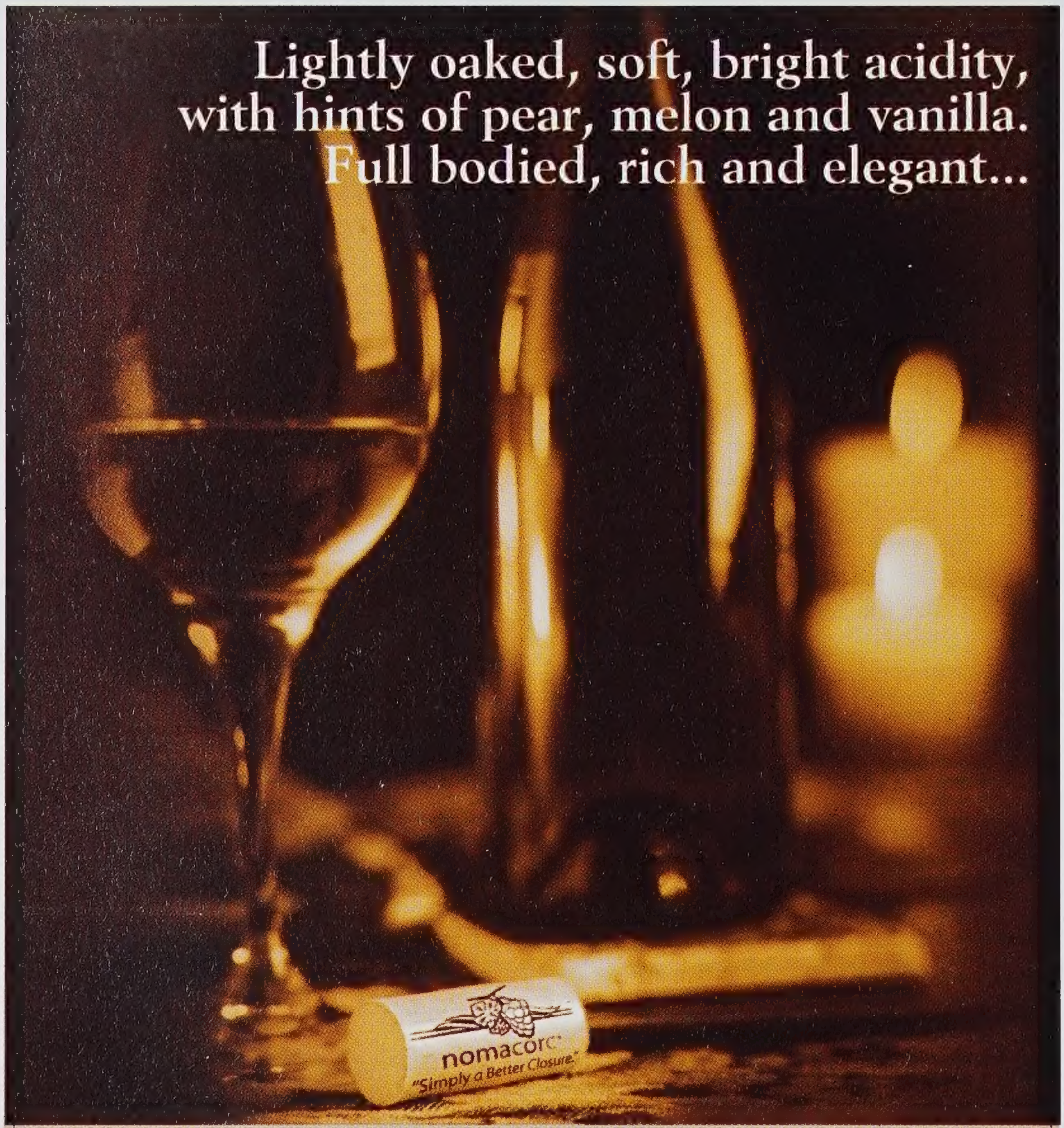
For our experiments, we selected the most common GLRaVs found in California, GLRaV-1, -2, -3, and -4. GLRaV-2, -3, and -4 were from infected *Vitis vinifera* cv. Thompson Seedless vines in the UC Davis grapevine clonal virus collection. GLRaV-1 was from infected *V. vinifera* cv. Pinot Noir vines in a commercial vineyard.

Most mealybug cultures were maintained on sprouted, organic potatoes in glass mason jars with silk-screen fabric covers.

Testing was also done on an accession of grapevine infected with corky bark disease, another serious viral disease that some researchers believe may be transmitted by mealybug. All but one of the virus accessions used were infected by more than one virus, a situation recently found to be so common in grapevines that it is difficult to find single infection sources of these viruses.

When these experiments were initiated, the techniques available to characterize the virus profiles were still under development, and it was not possible to determine whether the vines had single isolates of these diseases. Results of recently completed molecular and biological screening of these virus sources are in Table I.

Dormant cuttings approximately 18 inches long from each source vine were stored at 34°F until needed. Canes were rooted and then grown in a greenhouse until they were about two to three feet tall, ELISA-tested, and used for acquisition feeding. Acquisition-feeding plants also were propagated by tissue culture. Approximately 0.25-inch-long nodes were cut from vines in the field, grown in tissue culture, and then transplanted to the greenhouse and grown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The authors developed a unique method for transferring mealybugs, which involved placing leaf cuttings from virus-infected plants onto healthy Cabernet Franc plants so that insects were not harmed by direct handling.

to about three feet tall. All plants were ELISA-tested to ensure they were infected with virus.

Virus detection

Virus-source plants were tested for grapevine viruses by methods including herbaceous host indicators, woody indexing, ELISA and reverse transcriptase-polymerase chain reaction (RT-PCR or PCR). Virus detection technology advanced significantly throughout the duration of these experiments, greatly improving our ability to detect and differentiate between grapevine viruses.

When our work was initiated in 1992, all virus sources were tested with herbaceous and woody indicator tests, the most reliable biological tests available at that time[9]. By the conclusion of the project in 2001, both ELISA and PCR tests were used to better characterize virus sources.

Herbaceous indexing involves a mechanical inoculation of susceptible herbaceous plants in the greenhouse. Woody indexing is accomplished by chip-budding virus-infected sources on susceptible cuttings of indicator grape selections and planting them in the field for two years of observation. Both types of tests are very sensitive in detecting the presence or absence of the disease, but do not identify the specific virus-causing symptoms on the indexing host.

For example, the woody index on *V. vinifera* cv. Cabernet Franc determines if leafroll disease is present, but does not tell which virus is causing the disease. Another major limitation of the woody indicator test is the two years required for completion.

A special type of ELISA called $F(ab')_2$ was used to detect virus infection in test and virus-acquisition plants.[12] A test was considered positive if the sample had an optical density of at least three times above the healthy control and was over 0.1. Plants were observed for symptoms and tested by ELISA a minimum of three times over a two-year period. Plants that tested ELISA-positive were established in a vineyard to document disease development.

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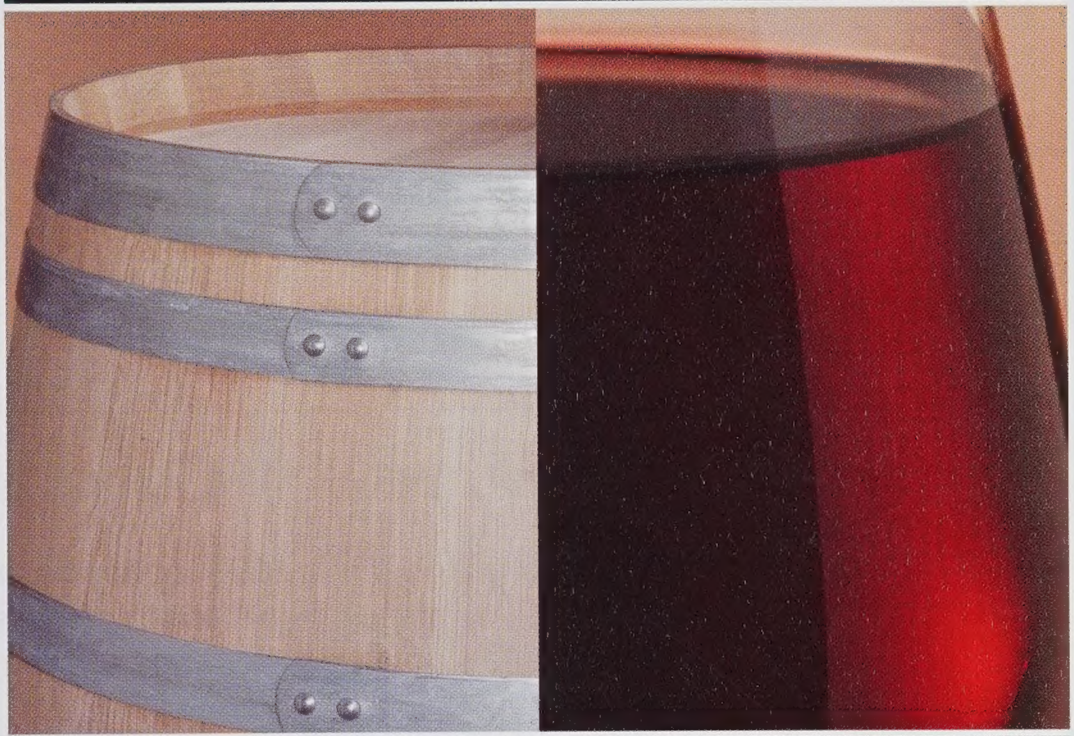

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TABLE I. Virus accession number, and viruses detected in acquisition-access plants and test plants (after mealybug inoculation)

Accession no.*	Viruses† detected in acquisition-access parent plant by ELISA and/or PCR	Virus detected in inoculated test plant
LR101	GLRaV-3, GRSPaV	GLRaV-3
LR102	GLRaV-1, GLRaV-2, GLRaV-5, GVB, GRSPaV	GLRaV-5
LR106	GLRaV-4, GRSPaV	None
LR109	GLRaV-2, GLRaV-3, GFkV , GRSPaV, GVC	GLRaV-3
LR114	GLRaV-1, GLRaV-2, GVB, GRSPaV	None
CB100	GLRaV-2, GVB	None
CB116	GLRaV-3, GVA, GVB, GVD	GLRaV-3
Healthy	None	None

* Each acquisition-access plant was ELISA-tested before use. Test plants were ELISA-tested a minimum of four times at 3, 6 and 12 months after inoculation and after the test plant had gone through at least one dormancy period. A subset of plants that tested ELISA-positive was planted in a vineyard for long-term observation and PCR-testing.

† GLRaVs = grapevine leafroll–associated viruses (1–7); GVA, GVB, GVD = grapevine viruses A, B, D; GFkV = grapevine fleck virus; GRSPaV = grapevine rupestris stem pitting–associated virus.

All GLRaV source vines were screened using PCR and/or ELISA for GLRaV-1, -2, -3, -4, -5, and -7; grapevine viruses A (GVA), B (GVB), and D (GVD); grapevine fleck virus (GFkV); grapevine fanleaf virus (GFLV); tomato ringspot virus (ToRSV); arabis mosaic virus (ArMV); grapevine rupestris stem pitting–associated virus (GRSPaV); and grapevine rootstock stem lesion–associated virus (GRSLaV). PCR reactions were performed using a simplified RT-PCR technique optimized for grapevine tissue.[13] With this new technology, it became clear that many of our virus sources were infected with more than one virus.

Testing for disease transmission

Mealybugs are difficult insects to manipulate for vector experiments. In our initial work, we found that even when individual adults — each about the size of a pinhead — were handled gently using fine brushes, transfer between plants often resulted in death of the individual, likely caused by damage to their fragile feeding stylet.

Extensive experimentation was thus done with acquisition-access feeding, transferring mealybugs to infected grapevines by a number of different techniques. A simple and effective procedure was developed that allowed us to screen each species for its ability to transmit the

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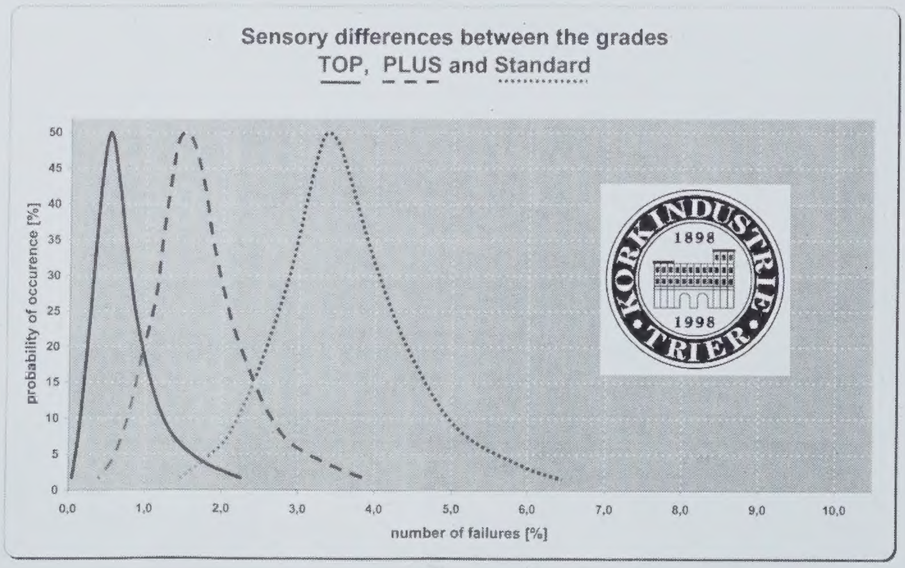

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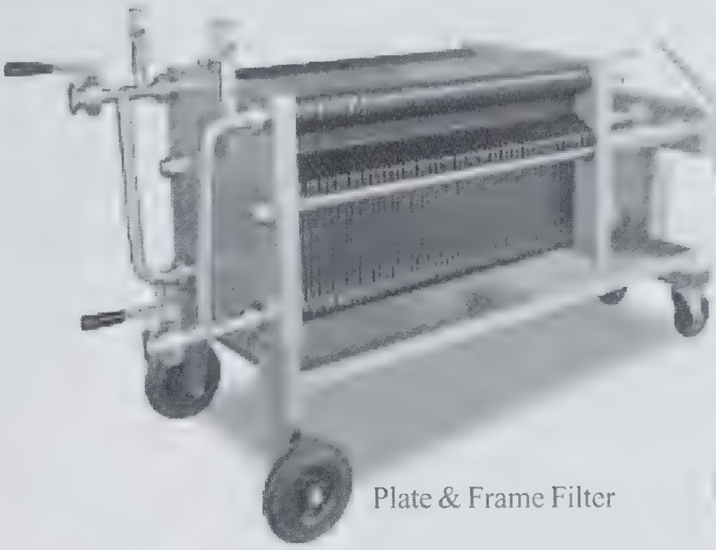

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various GLRaVs. Leaf pieces were cut from one plant and placed on another.

Adult insects did not move, even as the leaf dried, and they eventually died; however, the nymphal stages would move to the new plant and start feeding. A standard period of 14 days was established for acquisition and transmission based on this work. Crawlers (first instar mealybugs) were used for the acquisition-access feeding on virus-infected plants, then moved with leaf pieces to healthy test plants for possible transmission of the viruses.

Bulk transmission tests were performed to determine if a mealybug species could transmit a given virus type. Mixed stages of mealybug were established on virus-infected grapevines, using the method described above. Plants were placed in individual box cages, and caged plants of each virus were placed in separate walk-in

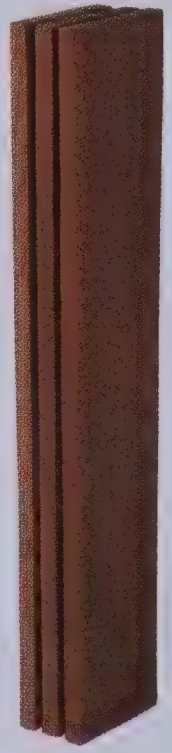

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TABLE II. Summary of virus transmission tests by California mealybugs

Virus accession no.	Avg. % infection*	Range (%)†	No. plants tested‡	No. exp.§
Longtailed mealybug				
LR101	37	21–60	80	4
LR102	<1	0–10	120	4
LR106	0	NA	70	3
LR109	35	10–55	100	4
LR114	0	NA	110	3
CB100	0	NA	175	6
CB116	nt	nt	nt	NA
Healthy	0	NA	125	NA
Control (none)	0	NA	125	NA
Obscure mealybug				
LR101	0	NA	85	3
LR102	0	NA	70	2
LR106	0	NA	45	3
LR109	19	0–33	65	2
LR114	0	NA	35	2
CB100	0	NA	30	2
CB116	nt	nt	nt	NA
Healthy	0	NA	85	NA
Control (none)	0	NA	85	NA
Grape mealybug				
LR101	nt	nt	nt	nt
LR102	0	NA	25	2
LR106	nt	nt	nt	nt
LR109	41	17–66	23	2
LR114	nt	nt	nt	nt
CB100	nt	nt	nt	nt
CB116	90	NA	10	1
Healthy	0	NA	13	5
Control (none)	0	NA	18	5
Citrus mealybug				
LR101	0	NA	40	2
LR102	0	NA	40	2
LR106	0	NA	80	4
LR109	5	NA	40	2
LR114	0	NA	40	2
CB100	nt	nt	nt	nt
CB116	nt	nt	nt	nt
Healthy	0	NA	40	12
Control (none)	0	NA	40	12

* Average percent of plants positive for virus infection after inoculation using mealybugs.

† Range of transmission percentages over different experiments.

‡ Number of plants inoculated and tested.

§ Number of experiments used with each mealybug and virus combination.

NA = not applicable.

nt = not tested.

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Mealybugs fed for an acquisition-access period of two weeks. One-node cuttings of healthy Cabernet Franc were used as inoculation test plants. Leaves of the virus-infected, mealybug-infested plants were cut into sections and arranged on test plants to allow inoculative mealybugs to crawl off as the leaf dried.

Approximately 10 to 20 mealybugs were observed feeding on each test plant. The inoculation access feeding period was two weeks, after which plants were sprayed with the insecticide chlorpyrifos (Dursban 2E) to kill the mealybugs. Mealybugs from healthy grapes and test-plants with no mealybugs were used as controls, ensuring that our insect cultures were not inoculative and that spread had not occurred by some other means under our experimental conditions.

In most tests, at least 30 plants were exposed to mealybugs that had fed on a virus-infected plant, 10 plants were exposed to mealybugs that fed on a healthy grape plant, and 10 plants had no mealybug feeding. The single exception was the test conducted with grape mealybug, which had only 10 inoculated plants: five healthy and five with no mealybug control-plants. Because of the difficulty in obtaining sufficient numbers of grape mealybug, it was not tested with GLRaV-1 and -4 sources.

Tests were also performed to determine the minimum period necessary for mealybug to acquire the virus. For these experiments, a fine brush was used to transfer longtailed mealybugs to a grapevine infected with LR109. The mealybugs were allowed to feed for either 3, 6, 24, 48, or 72 hours, or two weeks. Fifteen to 20 insects were transferred to each of the 10 test plants for each acquisition time period, and allowed to feed for two weeks to transmit the virus to test plants.

To determine the minimum period necessary for virus transmission, longtailed mealybugs that had been reared on an LR109-infected grapevine (and therefore were highly inoculative) were transferred on a fine brush in groups of 15 to 20 insects to each of 10 test plants. After allowing them to feed for a specified length of time, they were sprayed with insecticide. Time periods tested were 24, 48, and 72 hours, and 7, 14, and 21 days.

Indicator grape test plants

Dormant, healthy cuttings of Cabernet Franc were used for GLRaV transmission tests. Cabernet Franc is highly susceptible to leafroll disease and shows very strong symptoms of infection; it is frequently used as a biological indicator for the disease.

One-node cuttings of dormant canes were rooted in sand on warm mats and transplanted to 4-inch pots. Plants were inoculated when they were approximately six inches tall with three to four leaves. They were transplanted to gallon

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pots after one month and held in an insect-proof greenhouse and screen house for testing. All plants were periodically cut back during the growing season. They were pruned to two buds during at least one dormant season.

Test plants were ELISA-tested a minimum of four times at three, six, and 12 months after inoculation and, a final time after the test plant had gone through at least one dormancy period. Some of the inoculated plants that became infected were planted in a vineyard for further testing. Woody indexing showed them all to be positive for leafroll disease on Cabernet Franc and negative for other diseases on the indicators St. George, LN-33, and Kober 5BB. They were also retested by PCR for other grapevine viruses.

Mealybug spreads leafroll viruses

Four California species of mealybug — obscure, longtailed, citrus, and grape — can transmit California GLRaV-3 isolates (Table II). These experiments demonstrated for the first time that obscure and grape mealybug are capable of transmitting GLRaV-3 viruses.

Previous reports of the ability of longtailed and citrus mealybug to transmit GLRaV-3,[2] and that our experimental populations from California vineyards are competent vectors have been confirmed. Only one other apparent virus transmission was recorded: two Cabernet Franc vines fed upon by longtailed mealybug developed severe leafroll symptoms and PCR-testing revealed the presence of GLRaV-5. This is the first record of GLRaV-5 transmission by any vector.

Extensive screening of the test plants was unable to detect transmission of any other grapevine leafroll-associated viruses, even when inoculum sources were infected with multiple virus types.

Only GLRaV-3 and GLRaV-5 were transmitted by the mealybug species and, to the limits of our detection ability, none of the other viruses present in the original virus sources were transmitted.

Apparently, the mealybug acted as a filter and created single infections of GLRaV-3 and GLRaV-5. This is likely due to the specificity of virus and insect interactions of each leafroll virus type.

Mealybug may never transmit other leafroll viruses, although it is difficult to draw conclusions from negative data of this nature.

The single infections we have created will prove valuable for future research. Much of the work on the effects of these viruses has been done with multiple infections, making it hard to determine the effect of individual viruses; these new single infections will allow research on individual viruses.

This work was conducted using laboratory populations established from a single vineyard for each of the mealybug species. In the case of grape mealybug, all the insects came from just a few vines. We would expect there to be population

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variation related to vector efficiency and specificity within the mealybug species.

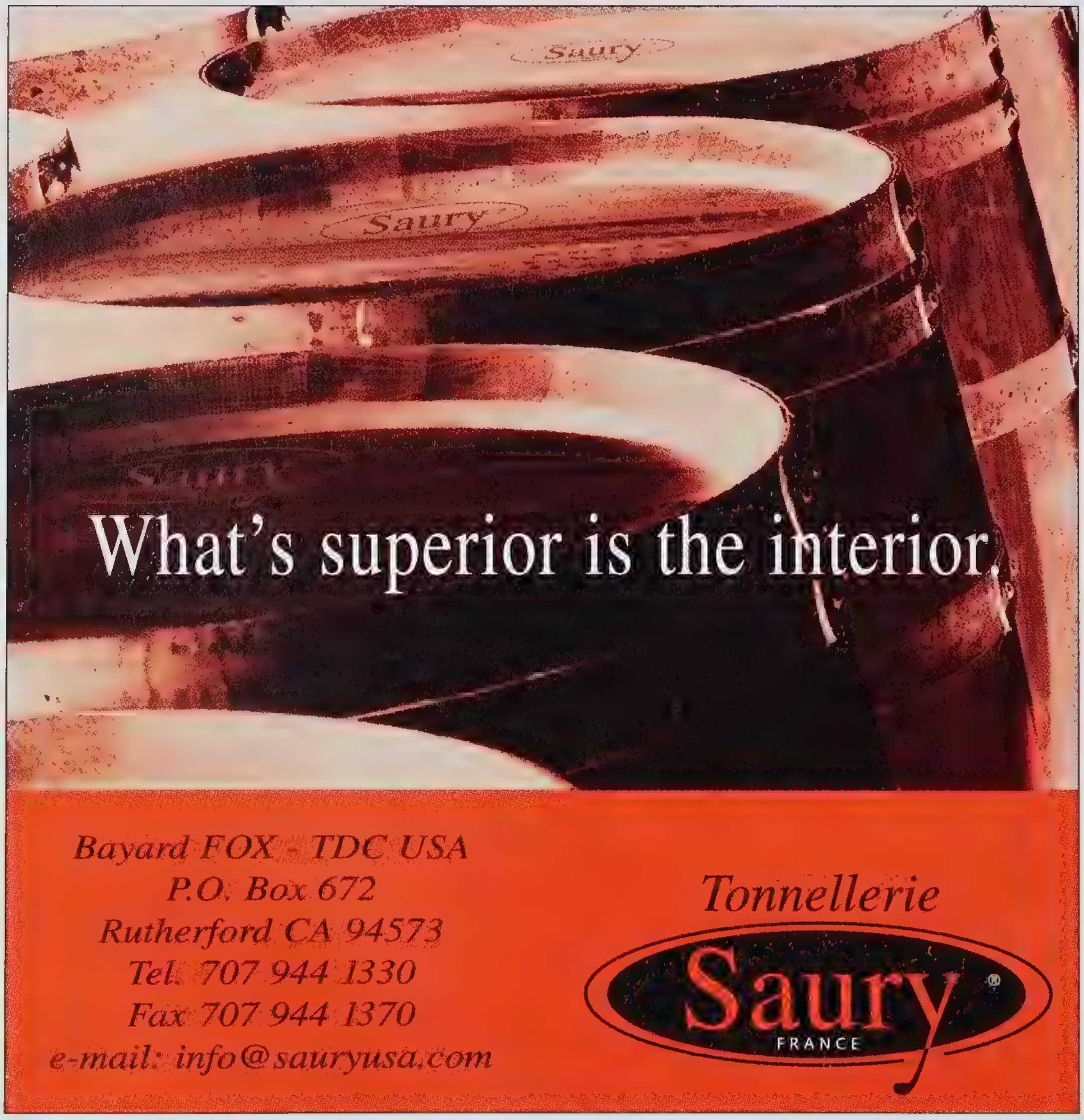
Furthermore, it was possible to test only a limited number of virus strains and types. We have demonstrated that it is possible for transmission to occur, but cannot yet comment on the variation in vector potential beyond these laboratory populations. Additional work with diverse collections is needed to generalize more broadly about the transmission biology of California populations of these species.

During our work, reports have been published confirming transmission of GLRaV-3 by the soft scale *Pulvinaria vitis* (Linnaeus). We now also know that GLRaV-1 is transmitted by two species of soft scale insects, but not mealybug.[10] These two soft scale species, *Parthenolecanium corni* (Bouché) and *Neopulvinaria innumerabilis* (Rathvon), are found in California.

Our tests to determine a minimum virus-acquisition feeding period for longtailed mealybug were inconclusive; no virus transmission was observed at the shorter intervals. We believe this may have been due to the necessity of handling the fragile individual mealybugs twice to complete the experiments.

The tests to determine minimum virus-transmission feeding period by this species were more successful. Virus transmission occurred within 24 hours, the shortest period tested, indicating that the minimum acquisition-feeding period is less than one day.

The results clearly indicate that the obscure, longtailed, citrus, or grape mealybug could have been responsible for the spread of GLRaV-3 observed at the foundation vineyard. A rigorous search in the old foundation vineyard did discover limited numbers of grape mealybug. This does not prove that mealybug was the cause of leafroll spread in the collection, but does indicate a possibility since they are present in the area.



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Future strategies

Based on these results, it is clear that the species of mealybug found in California vineyards are capable of transmitting at least two of the viruses that cause leafroll disease, GLRaV-3 and GLRaV-5.

Although documented cases of field transmission are rare, it is essential that vines in the California Grapevine Registration and Certification Program be protected from natural disease spread, both at the FPS vineyard and at commercial nurseries producing certified stock.

To ensure maximum protection of nursery stock, we recommend implementation of greater isolation of registered plants from any potential virus source plants and control of mealybug populations in these plantings. By combining these practices with regular monitoring of registered vines and the new laboratory tests, it will be possible to produce a high-quality grapevine stock free of target viruses. ■

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[D.A. Golino is cooperative extension plant pathology specialist, S.T. Sim is staff research associate, and A. Rowhani is plant pathology specialist, Department of Plant Pathology, UC Davis. R. Gill is senior insect biosystematist, Plant Pest Diagnostic Center, California Department of Food and Agriculture. The authors thank Mary Bianchi, San Luis Obispo farm advisor, for assistance in locating mealybug populations; Kent Daane, UC Berkeley Extension assistant specialist, for populations of citrus mealybug and advice on insect rearing strategies; Glen Friebertshauser, Agri-Analysis, for GLRaV-1-infected cuttings; and Estelle Devevre and Jorge Jimenez for excellent technical assistance. We gratefully acknowledge financial support provided by the American Vineyard Foundation, the California Table Grape Commission, and the Fruit and Nut Tree and Grapevine Industry Advisory Board. Portions of this work have been previously published as abstracts.

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Continued on page 85

129 KW solar system at Shafer Vineyards, Napa, CA. Two arrays face east, two face west, and the ground mount (top right of photo) faces south for maximum exposure of panels. Photo courtesy Premier Power

Advice from the experts
SMARTER SOLAR ENERGY

BY Tina Vierra

No one doubts that solar energy and other forms of renewable energy are a smart move for wineries, and Planet Earth in general. The process of switching your winery to solar energy, however, is expensive, complicated, and requires months to accomplish. Experts and the wineries who have already done it offer a variety of suggestions (and cautions) to wineries contemplating the change.

Manage your energy demand first

The first task involves establishing your winery's baseline energy use, and perhaps obtaining an energy audit if you haven't already. (See "Benefits of Energy Auditing for Your Winery" May/June 2005.) Although *PWV* offered several alternatives for low-cost partial audits in that article, experts say that if you are going solar, invest in a professional engineer and a full audit. You'll see why this relationship (winery to independent engineer) will be important both before and after you install a solar photovoltaic (PV) system.

Why obtain energy use figures and an audit? Because your energy consumption will determine the size of solar array appropriate to your winery's needs. Given the large capital investment demanded by the installation of solar power, reducing your energy demand before going solar will pay you back in reduced capital outlay.

"The most common ways for wineries to reduce demand are with insulation, upgrades of lighting, HVAC, refrigeration, and drive motors," says Rick Whisman of PowerLight Solar Electric Systems (Berkeley, CA) which recently installed a 424 KW system at Wine Service Co-Op (WSCO) in St. Helena, CA.

Gopal Shanker of Wine Business Strategies (Calistoga, CA), was the independent consultant who advised WSCO general manager Bob Holmes on efficiency upgrades and selection of a solar installer to meet WSCO's needs.

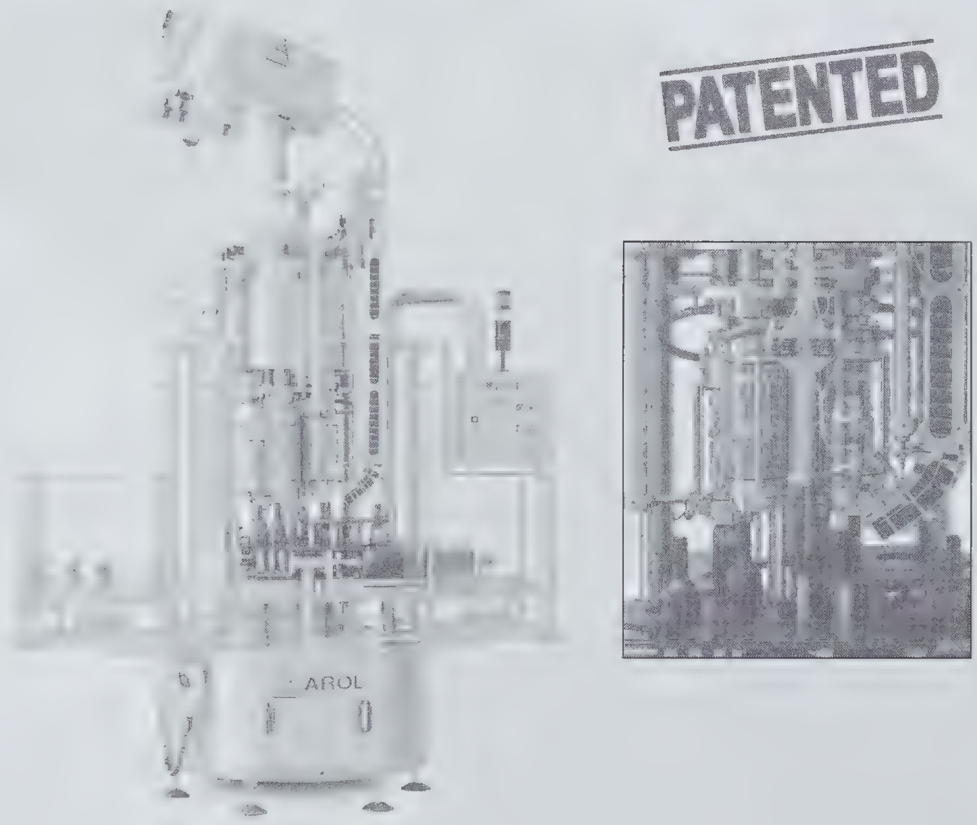
"WSCO had already replaced one roof with a more efficient, better-insulated one, which meant they did not need the added expense of insulated solar panels," explains Shanker. "They also planned a lighting retrofit, a second insulated roof, and an HVAC upgrade, which reduced the size of the solar array needed from 508 KW to 424 KW. Reducing baseline energy use allowed WSCO to install a system 17% smaller than originally needed."

Many solar energy providers work with wineries to reduce energy demand before solar panels are installed. Darryl Conklin, president of Renewable Technologies Inc. (RTI) in Sutter Creek, CA, says: "RTI engineers are trained by Pacific Gas & Electric (PG&E), to perform energy audits in a winery to reduce energy

33.3 KW solar system at Robert Sinskey Vineyards, Napa. Panels are west-facing, with the larger array on a 20° slope and the smaller on a 10° slope. With five inverters, real yield of the panels averages about 28 KW. Phase II — a second PV system estimated at 35 KW, will be installed on the parking lot trellis structure in 2005. Photo courtesy REC Solar demand before designing a solar installation. Implementing these 'Best Practices' is how RTI and the market set the standards for the renewable technologies industry."

Sun Power and Geothermal Energy (San Rafael, CA) holds a general contractor's license and provides full professional audits by qualified engineers.

Shafer Vineyards (Napa, CA) installed a 129 KW photovoltaic system in 2004. "Prior to going solar, we had always been careful about our electrical use, so we didn't need to take extraordinary measures," reports Doug Shafer, president. "We worked with an independent engineer and our solar installer, Premier Power."



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Rebates, incentives, tax credits

Once you've established your energy demand and know the size of the solar array required, you are ready for the red tape. Solar energy installation is such an expensive venture that its proponents have long fought for, and obtained, government and utility incentives to attract homeowners and businesses to make the switch. That, of course, comes with complex paperwork requirements.

Currently, the California Energy Commission (CEC) and the California Public Utilities Commission (CPUC), through PG&E and other utility companies, offer rebates on the initial solar power installation. The rebates come from capped funds provided by utility rate-payers and dwindling state government funds, and since the money is limited, the waiting list is getting longer every day.

In addition to rebates, the State of California offers tax incentives. Solar-powered businesses are exempt from property taxes on the amount their property value increases from the solar installation. They also receive a 7.5% state tax credit. The federal government gives a 10% investment tax credit. Both state and federal governments offer accelerated depreciation savings on solar installation.

How to make sense of all this? First, all solar energy providers have made themselves experts on the number-crunching and paperwork. Each can quote you a price for solar installation, followed by a list of reductions from the credits and rebates for which your winery qualifies. Many will even file the paperwork for you, or as Sun Power and Geothermal Energy did with Green & Red Winery (Napa, CA), will carry the rebates for you, charging the winery only the post-rebate cost of the system.

Then there is the matter of taking all of the above numbers to your bank for financing. Chris Bunas of SolarCraft (Novato, CA) knows his winery clients have a variety of financing options. "There is a personalized flavor of financing for every customer need. A winery may obtain financing by conventional property-secured means, or by business equipment lease," he explains. "In either case, we can provide a detailed 30-year proforma to a bank for review of the financing request."

Bunas cautions that rebates are up-front cash costs the installer can handle for the winery, but the tax credits and depreciation are the tax-responsibility of the new system owner, and the solar provider can only estimate these numbers.

Once financing options are established, it makes the best sense for the winery to consult its accountant. "Solar companies provide good and valid information," affirms CPA Barbara Cooke of Brotemarkle, Davis and Company (St. Helena, CA). "But a winery needs projections specific to its own financial situation. Accountants should be pro-active, and should be brought in before a winery commits to solar installation, as with any acquisition or sale of assets."

Rob Sinskey, owner of Robert Sinskey Vineyards (Napa, CA), is a client of Brotemarkle Davis & Co., who consulted his accountant before the winery installed a solar photovoltaic system (by REC Solar, Los Osos, CA) in late 2004. Sinskey filed for rebates but was turned down for the CPUC rebate (from PG&E) when the funds ran out before his claim was processed.

Though Sinskey determined his winery could use a solar array of 68 to 72 KW for 100% of its energy needs, with the loss of the rebates, he elected to install only a 33 KW system in 2004. The winery did receive the CEC rebate, tax credits, and accelerated depreciation.

Robert Sinskey winemaker Jeff Virnig is handling "Phase-2" — the second solar installation of about 35 KW — on the trellis system above the winery's visitor parking lot in 2005. Both available rebates were obtained on the second installation.

What can you expect solar panels to produce?

Solar photovoltaic energy systems are 100% efficient only under ideal conditions, as in laboratories. The true performance of PV systems depends on many real-world conditions and factors.

The first place you can lose power is in the intensity of UV light on a given day. The temperature of the panels and their inverters also plays a role, as does the age of the PV modules. "Equipment warmed by outdoor temperatures higher than those in lab conditions can produce 10% to 12% less power," notes Shankar.

Next, the number of panels wired together, and the number of inverters used, can reduce system output. The more inverters in use, the more system efficiency you stand to lose. Jeffrey Patterson of Mount Eden Vineyards (Saratoga, CA) evaluated the pros and cons of using multiple inverters when Akeena Solar installed a 20 KW system in 2003.

"The inverters can be the weakest link in a PV system," says Patterson. "If we had only one inverter and it went down, the whole system would be down. We decided it was safer to use nine inverters, in spite of power loss. If one inverter goes down, we still have a working system."

Positioning (facing direction and angle of the panels), distance from the meter, and unblocked exposure of the panels to UV rays are the final ele-

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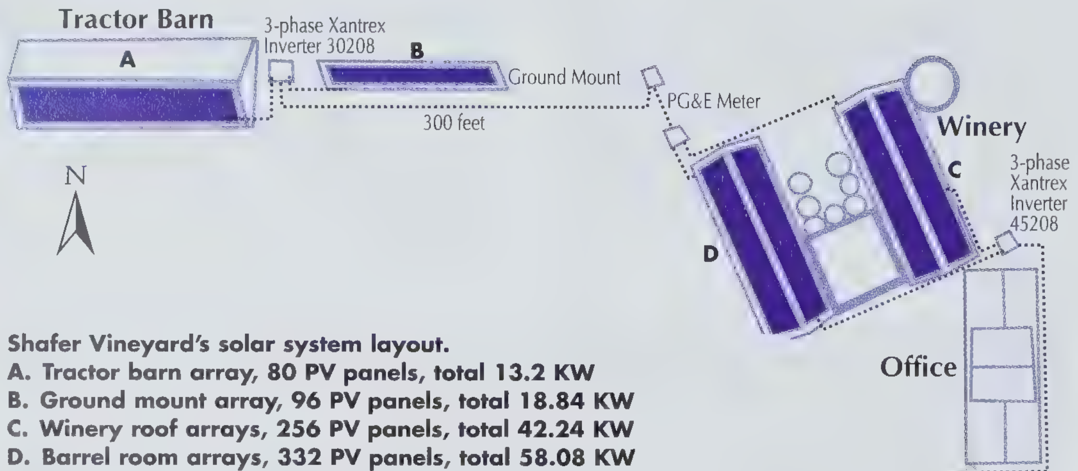

Shafer Vineyard's solar system layout.
A. Tractor barn array, 80 PV panels, total 13.2 KW
B. Ground mount array, 96 PV panels, total 18.84 KW
C. Winery roof arrays, 256 PV panels, total 42.24 KW
D. Barrel room arrays, 332 PV panels, total 58.08 KW
Diagram courtesy Premier Power.

ments in the efficiency equation. Mount Eden Vineyards may have sacrificed some efficiency with inverters, but it was able to use optimal panel positioning. "We're up on top of a mountain, and were able to mount the panels at a 30-degree angle, facing south on a hillside," Patterson reports.

The only disadvantage to the location of Mount Eden's panels is their proximity to the winery's dirt access road. Patterson admits to being plagued by dust, and has to wash the panels weekly. He watches the monitoring system (provided by the solar photovoltaic system installer) for signs that the panels are losing efficiency. "Solar energy is so passive, you have to watch over it — a little bit of dust, a little cloud cover, and you can watch your output go down quickly."

Shafer Vineyards has panels on four rooftops plus a ground-mount set of panels. "We used existing rooftops for the two arrays facing east and two facing west," Shafer says. "On the ground mount, we were able to use the best south-facing direction."

Shanker of Wine Business Strategies summarizes the potential energy collection of panels with this example: "Say you have a 100-watt PV panel. The CEC rebate may be based on 84 of those 100 watts, indicating they expect about 84% of full efficiency from solar panels under field conditions. Given losses for multiple inverters (4% to 10%), dirt, daylight hours, precision of installation, wiring and voltage mismatches, panel direction (south-facing is best) and other factors, you can realistically realize anywhere between 67 and 84 watts from a 100-watt panel."

Net metering

Barry Cinnamon of Akeena Solar (Los Altos, CA), has shown clients how

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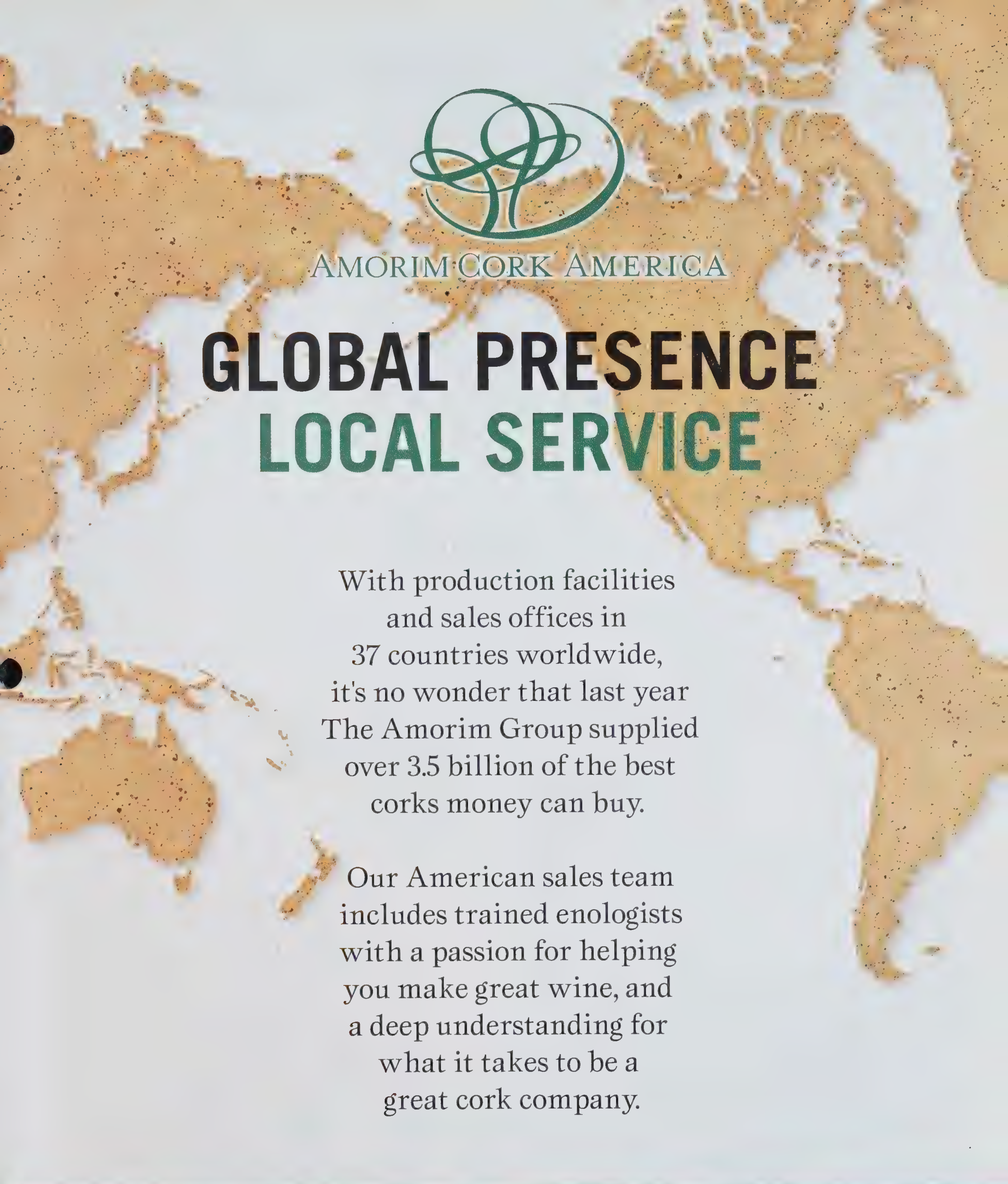

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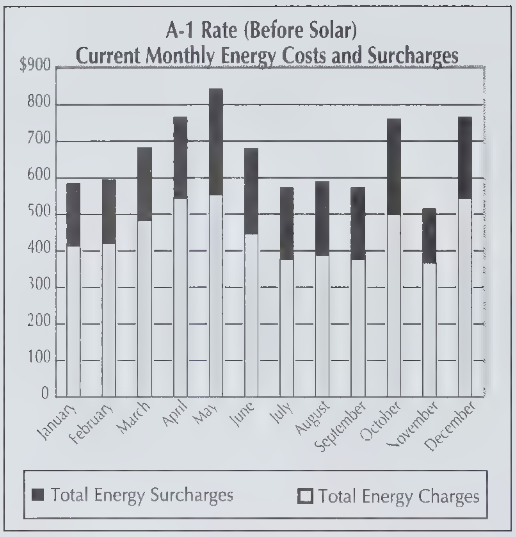

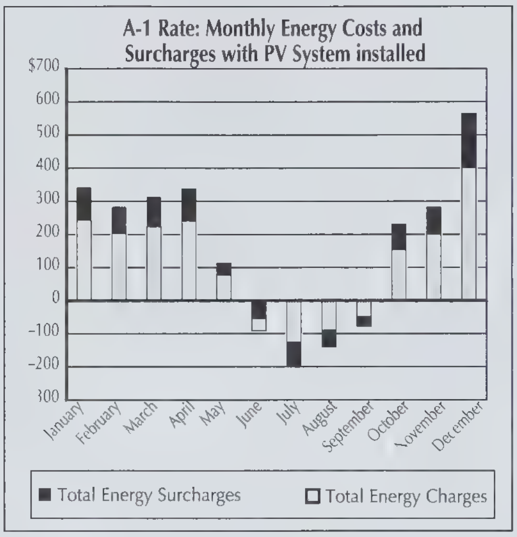

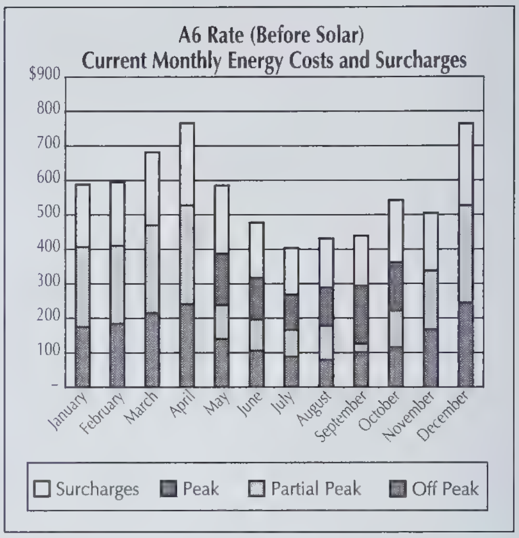

the net metering program (whereby new solar energy-producing wineries can feed excess electricity to the utility grid) is a good one but not without pitfalls and technical glitches.

"Rebates like net metering are available from most states to reduce or eliminate your electric bill, *not* to help consumers get into the commercial power generation business," says Cinnamon. "As a result, while your utility is legally required to buy power back from you at the retail rate, you are paid only up to the point where your net annual PV production equals your net consumption. In other words, the best you can do is break even."

Solar wineries on a net metering system are billed by the utility annually. It's better for the winery to get a small annual electric bill than to see a negative one. That's because if your net annual bill is in the negative, you've installed a larger PV system than necessary.

Back at the beginning, when you were establishing baseline energy use, you also needed to determine your winery's utility rate schedule.

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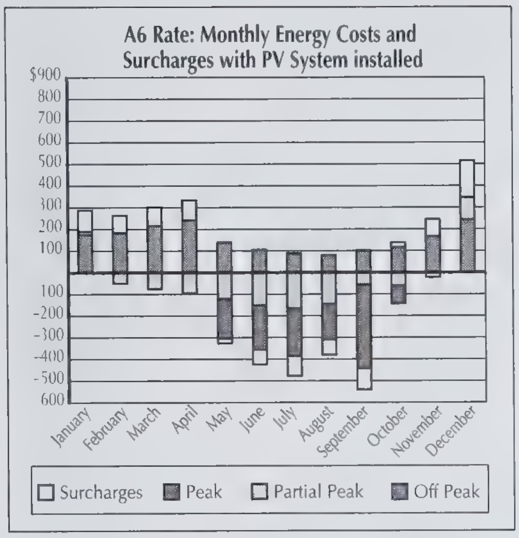
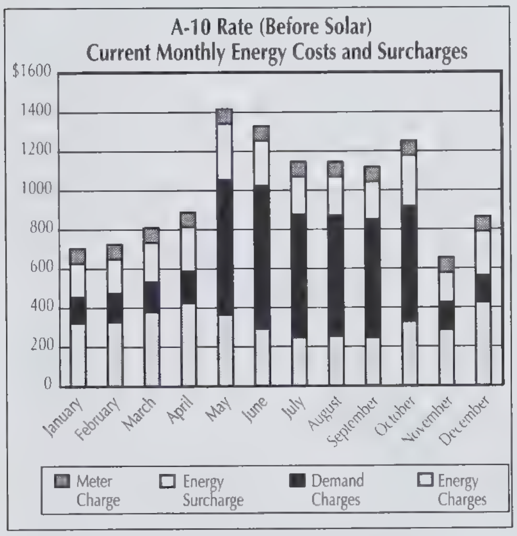
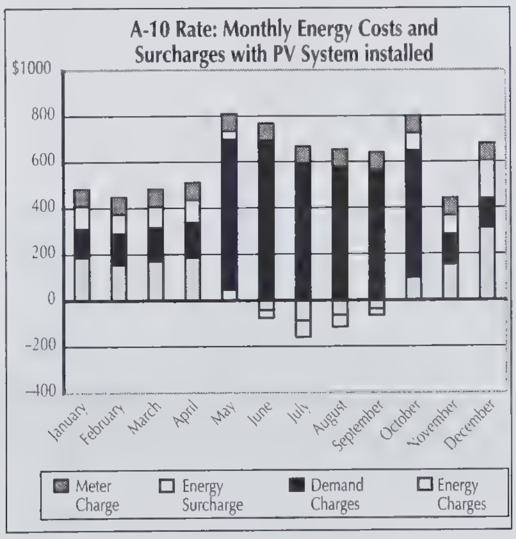

A6 Rate: Monthly Energy Costs and Surcharges with PV System installed

"A1, A6, A10, and E19 are the schedules we're seeing most often at wineries," says Cinnamon. "In general, time-of-use (TOU) rates like A6 are most advantageous to wineries going solar, as long as the PV system is sized properly."

Cinnamon has also found that some wineries are on E1 residential rates, owing to the winery having been a home-based


A-10 Rate (Before Solar)
Current Monthly Energy Costs and Surcharges


A-10 Rate: Monthly Energy Costs and Surcharges with PV System installed

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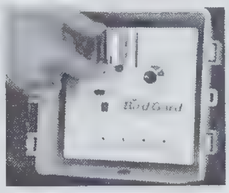

What vineyard managers are saying about the Mega PRO

"All the birds just left...nothing left. We even stopped using the canons. The Mega PRO really did a great job." - Bob Kidston, Dykeview Farms

"The Mega PRO paid for itself the first season because of the money we saved on bird patrols and pyrotechnics" - Daryl Salm, Valley Farm Management

"Two years ago we got the Mega Pro. After the horrible 2004 season, with many vineyards getting little or no grapes, a 3 acre section of riesling yielded 20 tons. Needless to say, our wine maker was very happy. Had the starling flocks been there, we would have lost $20,000–$30,000 worth of grapes." - Jack Keller, Hazlitt 1852 Vineyards

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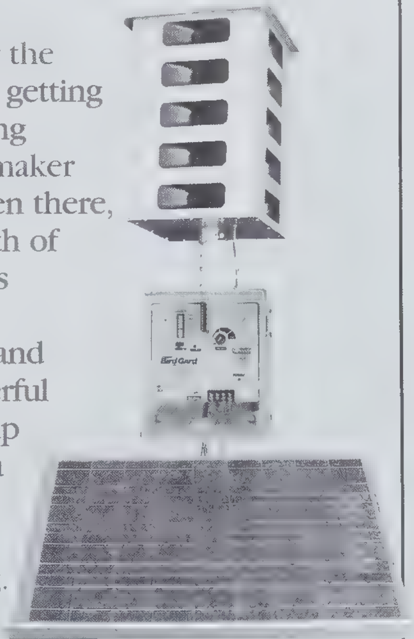
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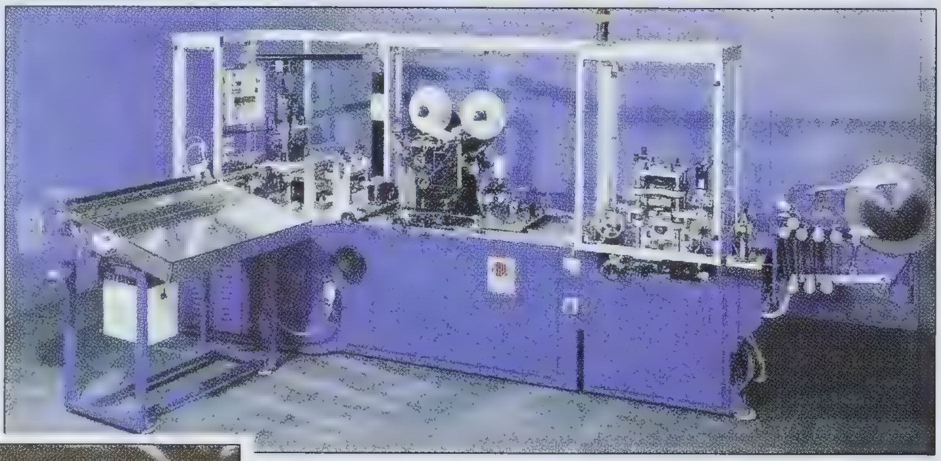

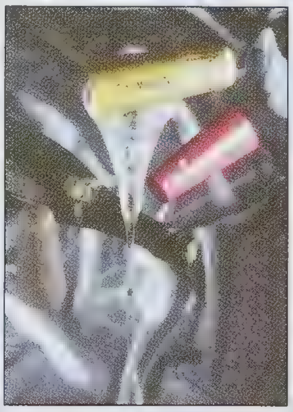

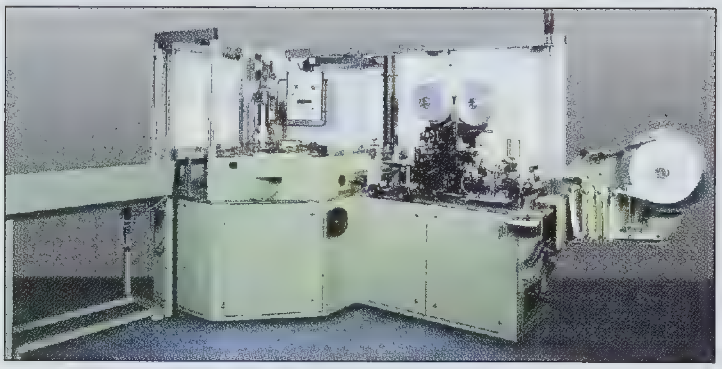

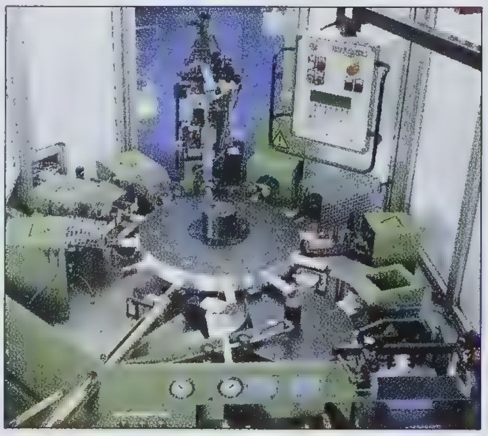

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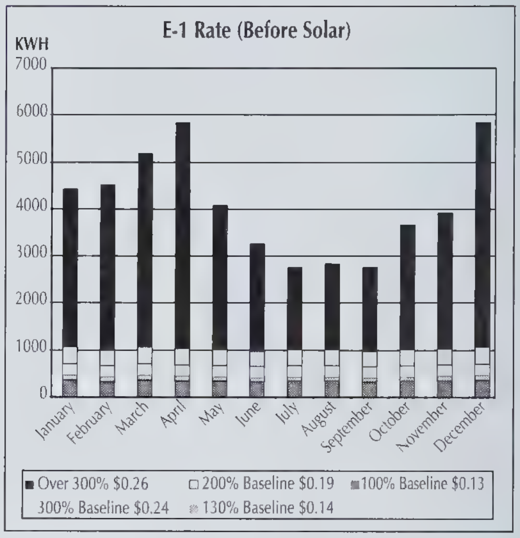
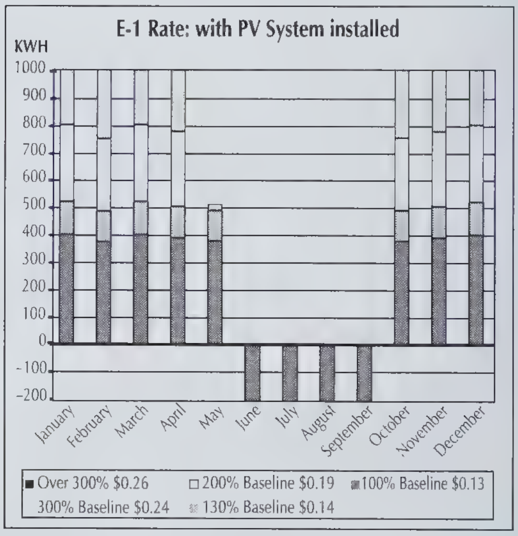


E-1 Rate (Before Solar)



E-1 Rate: with PV System installed

business which then grew to a viable commercial size. "In these cases, it may be advantageous to install a new commercial meter, since the basic commercial rate (A1) is more favorable under net metering than the basic residential rate. Your utility may not explain this to you."

Some wineries have reported to ***PWV*** that they had difficulties with PG&E when installing solar energy. Complaints ranged from slow service when swapping in the new meter for net metering, to glitches and failure of the new meter connection. Given these reports, keeping that engineer you hired in the beginning available, as Mount Eden Vineyard has done, may be advisable.

"The trick to achieving trouble-free interconnection is to do all of the paperwork properly at the outset," Cinnamon advises. "Make sure your installer knows about special utility requirements, and there is nothing out of the ordinary about your meter or electrical service before installing solar. We have heard about problems that relate to customers installing systems without utility approval, or trying to get PG&E to sign off before the local building inspector signs off on the construction permit."

Post-installation warranties

By law, PV panels and inverters must be warranteed for a certain number of years after installation. Ask your solar provider what warranty they offer under the laws of your state.

Savvy wineries need to know that they can also obtain warranties for more than just parts and service on the solar array. Holmes at Wine Service Co-Op has a PowerLight contract stating that they pay the Co-Op if the system does not earn the return on investment promised. Not all solar installers will offer a post-installation warranty unless the customer knows to ask.

Green Tags

Green Tags, more formally known as Renewable Energy Certificates (RECs), are purchased by energy consumers who wish to support renewable energy financially, even if they are not or cannot become renewable energy producers. The money from the sale of Green Tags must be used by the company who sold it for investment in renewable energy. One Green Tag is the equivalent of 1 megawatt (1,000 KW) of energy.

"If an energy consumer (such as a winery on a standard utility grid drawing power from fossil fuel sources)

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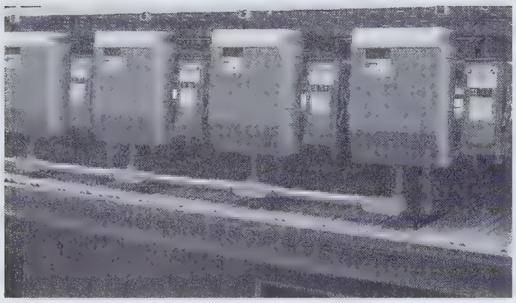

System inverters (brand is PVPowered, model PVP2800) mounted by REC Solar on back of solar panel racks at Raymond Burr Vineyards (Healdsburg, CA). Inverters convert DC to AC electricity and are the control units of the PV system. Photo courtesy Chris Bunas, SolarCraft.

wanted to switch to solar or other renewable energy, they could theoretically sell these Green Tags to help offset the cost of the project," reports Heather Zwaduk of REC Solar. "Green Tags vary in value from a few dollars to a few hundred dollars per MWh (Megawatt hour) of energy produced over the life of the system.

"Bonneville Environmental Foundation (www.b-e-f.org) is an example of a Green Tag buyer. The non-profit foundation supports renewable energy by purchasing Green Tags from companies who install renewable energy."

For-profit businesses also buy Green Tags when they find they want to support renewable energy, but are not good candidates for installing it on their own sites. To find sources to sell your Green Tag, check with your state and federal Energy Commissions, or the internet.

"The complication to Green Tags is the question of who owns them in the first place. In states such as New Jersey, the government has established that the solar power producers own their Green Tags. But in many other states, including California, the utility companies insist *they* should own the Green Tags, because they built the utility grids which receive the energy produced, and because they subsidized the installation cost through rebates."

The State of Nevada reached a compromise on the issue by requiring solar photovoltaic system owners to accept either the rebate or the Green Tag, but not both. The State of California, specifically the CPUC, is expected to clarify the issue for its citizens in 2005, a ruling that will affect the accumulated 93 MW of photovoltaic systems installed so far under rebate programs.

Since the Federal Energy Regulatory Commission (FERC) ruled in 2003 that the renewable system owners own their Green Tags unless stated otherwise by a state or a contract agreement, wineries who own renewable energy systems are advised by Fred Sisson (REC Solar vice president), to transfer ownership of a Green Tag only by signed contract, and to carefully investigate Green Tag ownership regulations in their own states.

Less than 10% of small-scale renewable energy site owners even know what a Green Tag is, and only 6% know they can sell it for extra revenue,

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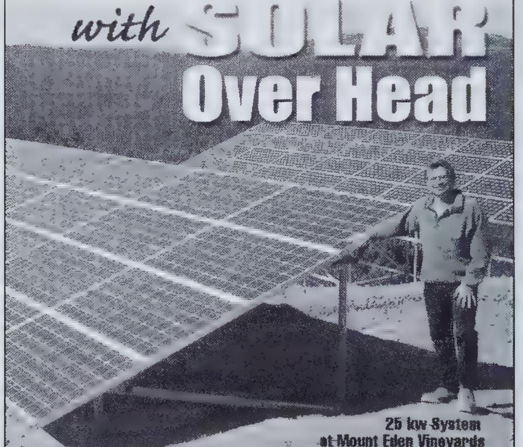

25 kw System
at Mount Eden Vineyards
Photo Courtesy Akeena Solar

"As a businessman, the estimated cost savings over the life of the system – made the decision a no-brainer. What we didn't realize was the PR value. We've been receiving calls from all over the country complimenting us for putting in the solar power system and asking how they can buy our wine!" – *Jeffrey Patterson, Owner*
Mount Eden Vineyards, Saratoga, CA

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according to the Center for Resource Solutions (quoted in *Photon International Magazine,* March 2005). Despite that confusion, the market for Green Tags continues to grow. Over 10 million MWh of Green Tags were traded in 2003, 12 times the volume of 2002.

Green marketing

Marketing your winery as organic, green, or whatnot is a difficult task, but studies show that consumers respond positively. With a choice of two bottles of similar wine on the shelf, 46% would buy an organic-labeled one, for instance, all other things being equal, reports Dean Marks, president of Premier Power (El Dorado Hills, CA).

Fifteen percent of American consumers would even buy the organic-labeled wine at a price up to 22% higher. Marks found the statistics in the National Environmental Education and Training Foundation "Roper Report," an annual evaluation of American attitudes toward the environment and knowledge of environmental issues.

"In consumer surveys, 48% of the population cares about the environment," adds Marks, "and is willing to purchase an eco-friendly product if it does not require too much effort."

Marks warns that simply installing solar energy will not automatically generate publicity and higher sales. "You need to go deeper than one step. Solar energy should be only one part of your winery's overall sustainable practices and core values."

Organic farming, recycling, waste management, and energy efficiency practices, together with renewable energy use, comprise the core list of practices most consumers deem "green," adds Marks.

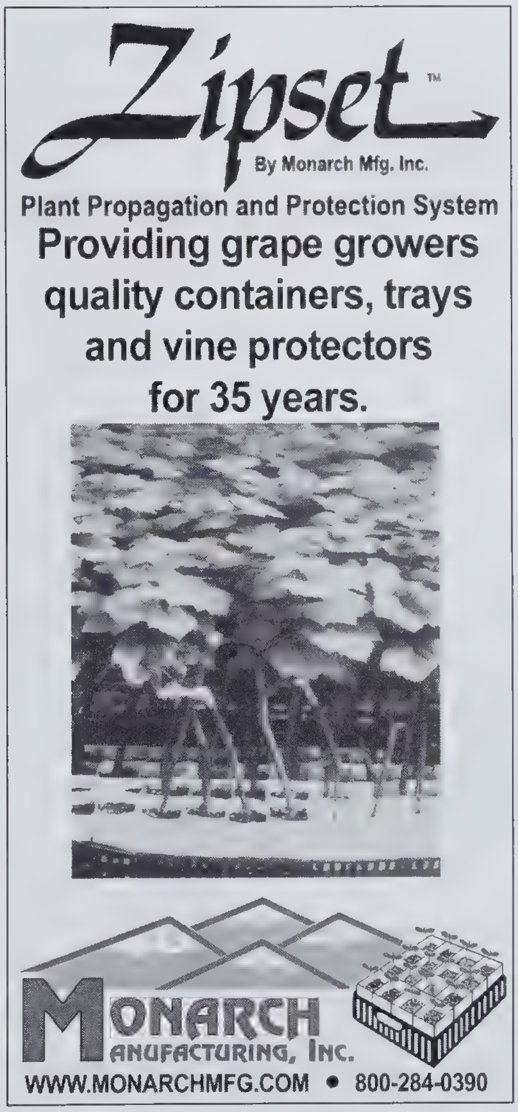
Sinskey agrees with going to sustainable practices in every aspect of winery business. "It has always been our philosophy to be green, so we're not doing this as a marketing attempt. We have been farming organically for almost 15 years. This is just one more step toward completing the process. We are also looking into alternative fuels and the increased use of animals in the vineyard. We want to walk the walk, not just talk the talk."

"Our approach to sustainable farming has been evolving since planting our first cover crops in the late 1980s," says Shafer. "Eventually it came to include erecting hawk perches, owl nesting boxes, making our own compost, recycling our water, putting songbird houses throughout our vineyards, erecting a bat box, etc.

"At each stage we've tried to communicate what we're doing new and why we're doing it. We know there are a number of consumers who prefer to buy from companies with core values embracing environmentally-friendly practices. I'm not sure that means we have a marketing plan. It would be great if we were that organized."

Future is bright for solar

In 2005, California Governor Arnold Schwarzenegger introduced Senate Bill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1 (SB1), authored by state senators Kevin Murray and John Campbell (one Democrat, one Republican), to the legislature. SB1, also being called the "Million Solar Rooftops Initiative," is the most ambitious solar plan yet introduced in the U.S. At press time, SB1 had cleared committee and was going to the State Senate floor, where it was expected to pass.

"SB1 is ambitious," affirms Shanker. "It intends to reward energy efficiency and solar energy installation. Wineries that become more energy-efficient *before* installing solar get extra credits." Shanker attends public forums on the bill's progress.

Under SB1, the CEC and CPUC rebates will be combined in one program. From January 1, 2006, incentive rates will be allowed to decrease no more than 7% annually until December 31, 2016, by which time, given additional rewards for companies who reduce their energy demand before installing solar, the state hopes to see one million homes and businesses install PV systems.

All new homebuilders would be required to offer PV systems after 2010. (Premier Power has already built one successful all-solar housing subdivision near Sacramento, CA, with two more underway.) The net metering cap would be raised from 0.5% of a utility's power grid to 2%, with the property tax exclusion and the 7.5% state tax credit extended until 2017.

"Right now," says Shanker, "the State of California is third in the world behind Japan and Germany in PV installations." Between 1994 and 2003, Japan increased its solar installations from 24 MW to 860 MW. In approximately the same time frame, Germany grew from 6 MW to 260 MW of solar. Under SB1, California would eclipse these numbers, because if the resulting program is successful, installations would grow from 93 MW in 2004, to 3,000 MW by 2017. ■

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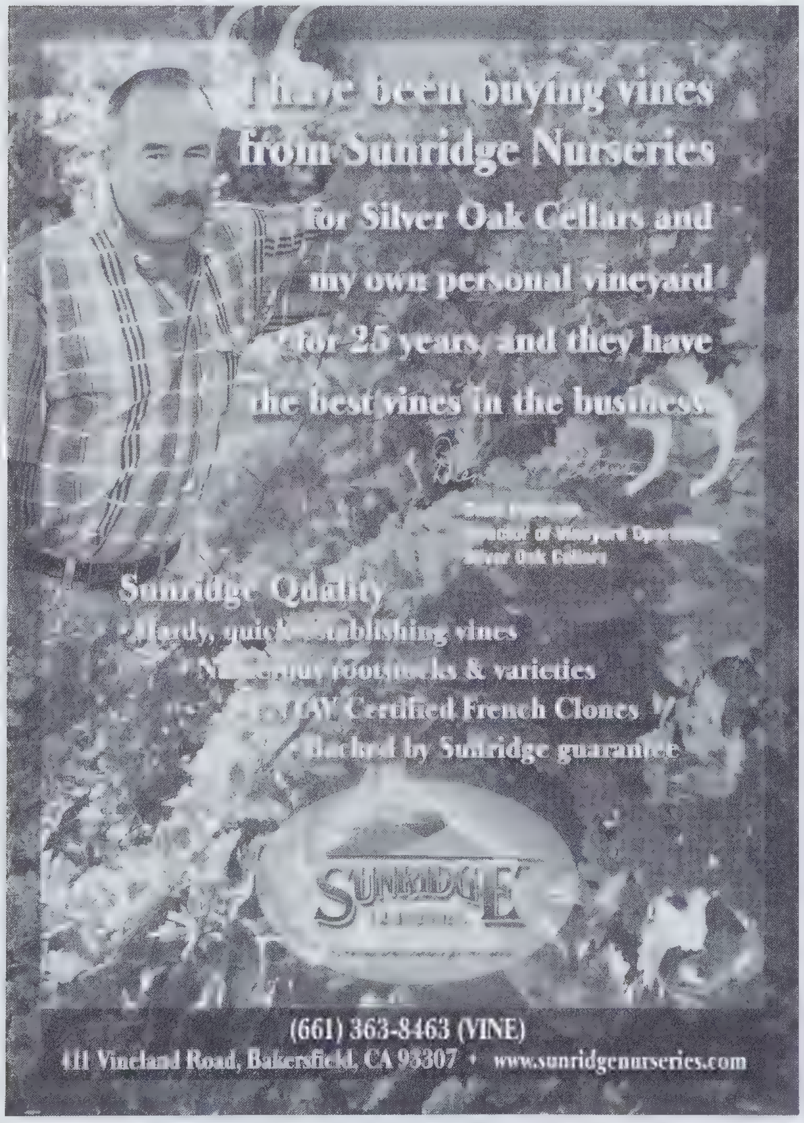
California Energy Commission renewable energy program, www.energy.ca.gov/renewables
Progress of Senate Bill 1 in California, http://info.sen.ca.gov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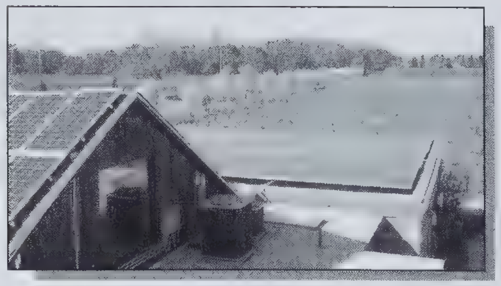

Renewable Technologies, Inc. also congratulates Lucas Winery and "The Supremes" on the 5-4 Supreme Court decision concerning the 21st Amendment!

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RHÔNE-STYLE WHITE WINES

Storming past sensory gatekeepers

BY Eleanor & Ray Heald
Contributing Editors

Call it revelation, realization, or eye-opener. At the March 2005 Rhône Ranger tasting in San Francisco, CA, owner/ winemaker Steve Edmunds of Edmunds St. John Winery (Berkeley, CA) checked all of the above.

Tasters responded strongly to two Edmunds St. John Rhône-style white wines: 2004 Shell and Bone and 2004 Roussanne.

Shell and Bone is a blend of 45% Viognier, 38% Roussanne, and 17% Marsanne. The Roussanne is 100% varietal.

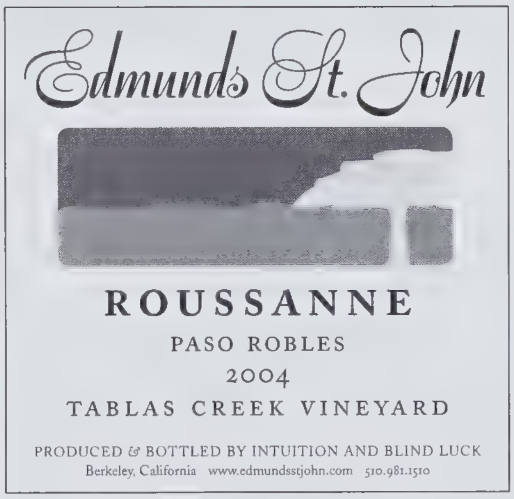
"I believe," says Edmunds, "the reaction was due to the wines interacting directly with the human nervous system. In the case of most California wines, the cerebral cortex mediates all responses. There's time to reflect on alcohol, sweetness, weight, structure, oak, and perfume.

"Before the wine finds its way down the gullet, there's time to organize information and tuck the wine away into a slot in the memory bank for future reference.

"But, the immediacy and urgency of aromas, textures, and olfactory dynamics of the 2004 Shell and Bone and 2004 Roussanne storm right past the gatekeepers in the front brain and light up the spinal column in a fusillade. Quite unusual for California wine."

Similar encounter

Edmunds suspects that this phenomenon is encountered more with European white wines from vineyards with limestone soil. He cites French wine regions — such as Chablis, parts of the Loire Valley, and one particular wine, Château de Beaucastel Roussanne Vieilles Vignes from the southern Rhône Valley, as examples.



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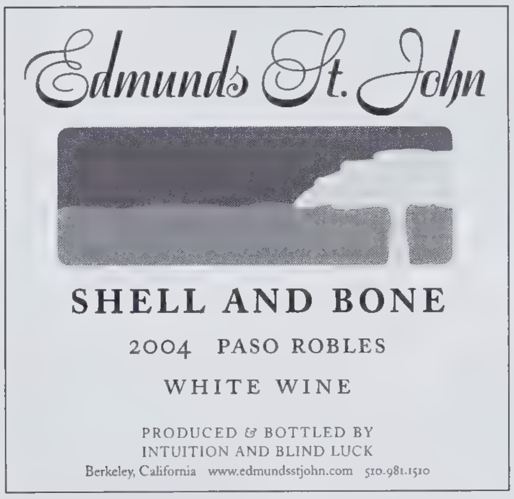

Edmunds St. John

SHELL AND BONE
2004 PASO ROBLES
WHITE WINE

PRODUCED & BOTTLED BY
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"My experience," Edmunds continues, "suggests that white grapes grown in limestone, which have low pH, impact the nervous system with what is sometimes called 'nervosity.'

"Wines with nerve remind one that they are not inanimate and passive. These wines are alive; there is a presence within them."

Edmunds knows this is too "woo-woo" for some people so he adds, "Wines with nervosity pass through the olfactory system like a stampede of wild horses and make direct contact with the nervous system — like 'Take me to your leader.' For this reason, they're hard to ignore."

In vintage 2004, Edmunds notes, the year also contributed to the experience because physiological ripeness was achieved at lower sugar levels. "In general," he notes, "this was the case in most California wine regions. Sugar levels and physiological ripeness were more like those in European wines and less like we've experienced in California of late. In 2004, California, in general, experienced a mild spring and mild summer without heat spikes.

"When red grapes are grown in limestone soils, the nervosity effect can also be experienced. Yet, it is perhaps less noticeable because of the phenolic content of red wine, and because white wines rely on acidity for structure where reds don't."

Shell and Bone

The wine name "Shell and Bone" refers to the vineyard soil composition in the hills west of Paso Robles where the grapes were grown. In the main, these soils are limestone residues of marine life from an ancient seabed.

Grapes come from two vineyards. Rozet Vineyard in Paso Robles, with decomposed clay-limestone soil and located one mile west of Highway 101 and 1/4 mile north of Highway 46 West, was planted to Viognier and Marsanne in 1998. Both varieties are on 101-14 and 5BB rootstocks.

Vines on a bilateral cordon (four two-bud spurs on each arm) are trained on a vertical, shoot-positioned trellis and thinned, typically to one bunch per shoot, yielding one ton per acre.

Organically-farmed Roussanne was purchased from Tablas Creek Vineyard, off Adelaida Road west of Paso Robles. The vineyard is a joint venture between the Perrin family of Château de Beaucastel and Robert Haas, longtime importer and founder of Vineyard Brands.

(See viticulture data under Roussanne subhead.)

Until vintage 2004, Edmunds called this white Rhône-style blend "Los Robles Viejos," in reference to old oak trees that characterize the region's landscape. "In a sense," he says, "the name for this Rhône-style white blend has transitioned from the realm of geography to that of geology. I believe that the 2004 vintage demonstrated the advantage of limestone soils, producing wines for the blend that have moderate alcohol (14.2%), and firm acidity (bottled at 0.71 TA and 3.28 pH)."

Edmunds assumes that limestone soil is the source of minerally elements discovered in the wine, giving a distinctive aroma, reminiscent of a newly harvested empty scallop or clam shell that smells briny, just like the ocean.

He senses this in all three of the white Rhône varietals used for the blend.

Winemaking

Tasting strikingly of apricot and lavender, Viognier grapes were picked on August 11, 2004, at 24.7° Brix, 0.65g/L TA, and 3.4 pH.

Marsanne was harvested August 18 at 22.6° Brix, 0.948 TA, and 3.43 pH.

On September 10 and 11, Roussanne was picked from 23.7° to 24.9° Brix, 0.737 to 0.809 TA, and 3.10 to 3.28 pH.

Juice from hand-sorted fruit was whole-cluster pressed into 20-year-old French oak puncheons. Uninoculated fermentation proceeded until Brix dropped to roughly 16°, at which point the yeast strain QA 23 (chosen for slow fermentation rate, low foaming, low H_2S production, and aromatic emphasis) was introduced.

During fermentation, Marsanne became "stinky" and was aerated vigorously and returned to puncheons.

All wines remained on gross lees until blending at the end of January 2005, after which the wine was crossflow filtered and sterile bottled on February 14. No acidity adjustment was made; neither was cold stabilization done.

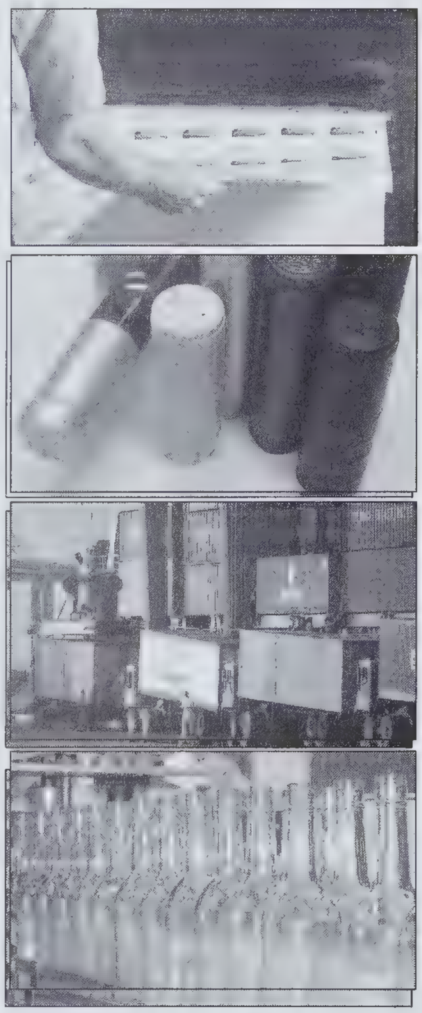
Although the Viognier and Marsanne were both ML+, the Roussanne, due to low pH, had not quite completed malolactic fermentation.

Early to bottle

"These grapes produced a wine with vibrancy, nervosity, and structure that is unlike any I've observed in the past 20 years of making wine," Edmunds contends. "I believe these characteristics, as well as some delicacy and perfume, would have been compromised if the wine was not bottled in a fresh state.

"Therefore, I made the decision to remove the wine from barrel at the end of January (following harvest) and to bottle earlier rather than later.

"Given the demonstrated ability of Marsanne, Roussanne, and Viognier to age well, I believed there was everything to gain and nothing to lose by bottling (254 cases) when I did."



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As proof of the ageability of Roussanne, Edmunds points again to Château de Beaucastel Roussanne Vieilles Vignes. To demonstrate the ageability of Marsanne, he notes that the French white Hermitage from J. L. Chave and Qupé Cellars (Santa Maria, CA) Marsanne are significantly more impressive after eight to ten years of bottle age.

As for Viognier, Edmunds cites the northern Rhône belief that Condrieu is not an ageable Viognier and should be consumed in the year after release. On the other hand, Château Grillet (Rhône) produces Viognier that is eminently ageable, as are Viognier bottlings from Calera Wine Company (Hollister, CA) and Alban Vineyards (San Luis Obispo, CA) — all with limestone-influenced soil composition.

Edmunds bottled one white Rhône varietal early only once before with the 1993 vintage. "Bottling white wines early is an annual goal," he admits, "but I'm a one-man operation and it's difficult. "With the 2004 Rhône-style white wines and their unique character, I was compelled to make time to bottle early."

Edmunds' tasting notes for the 2004 Shell and Bone ($25 retail) released on May 1, 2005, describe the wine as pale, yellow-gold with a slight hint of green. Aromas include lavender, apricot, preserved lemon, and honey beneath brine and stony-mineral. He says the multi-layered palate entry opens to richness, texture, great electric tension between fat and lean, brightness and opulence and notes commanding flavors and great length that need a few years to relax and stretch out.

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Edmunds predicts 2010 to 2012 as the optimal drinking window for Shell and Bone.

Roussanne

"I believe," notes Edmunds, "that Tablas Creek Vineyard is growing what is certainly among the very finest Roussanne in California. The opportunity to work with a few tons of that vineyard's Roussanne is something a lot of winemakers have fantasized about for any number of years. In 2004, we were lucky enough to really do it."

The Roussanne sourced by Edmunds is planted on the western side of the Tablas property, on a gentle slope to the west. Vines planted in 1998 on 110-R rootstock are trained on a vertical, shoot-positioned trellis and thinned to one bunch per shoot, yielding three tons per acre.

Roussanne for the varietal wine was harvested with the same parameters as the Roussanne used in Shell and Bone, treated in the cellar under the same regimen, and bottled on February 14 with a 0.78 TA and 3.12 pH.

Edmunds' tasting notes for this wine say it has a pale green-gold color with aromas of white flowers, mint, truffle, butter, honey, and rocks. It is a wine of great density and depth on entry with honey and a suggestion of candied lime and strong minerality in the flavors and shows impressive length, structure, and texture.

Edmunds believes that the 2004 Roussanne (185 cases), with a release date of September 2005 ($30 retail), will benefit from slow development in the bottle.

Last drop

Edmunds is releasing the 2004 Roussanne four months later than the 2004 Shell and Bone because the latter "has Viognier to offer the enhanced aromatics of lavender and apricot," he explains. "Early in the game, Roussanne needs more time to develop in the bottle. When first bottled, a white wine tends to break apart. It needs time to integrate with some bottle development."

The goal with both wines is to provide consumers with a wine that's fresh and simultaneously exhibiting the characters associated with some development in the bottle. ■

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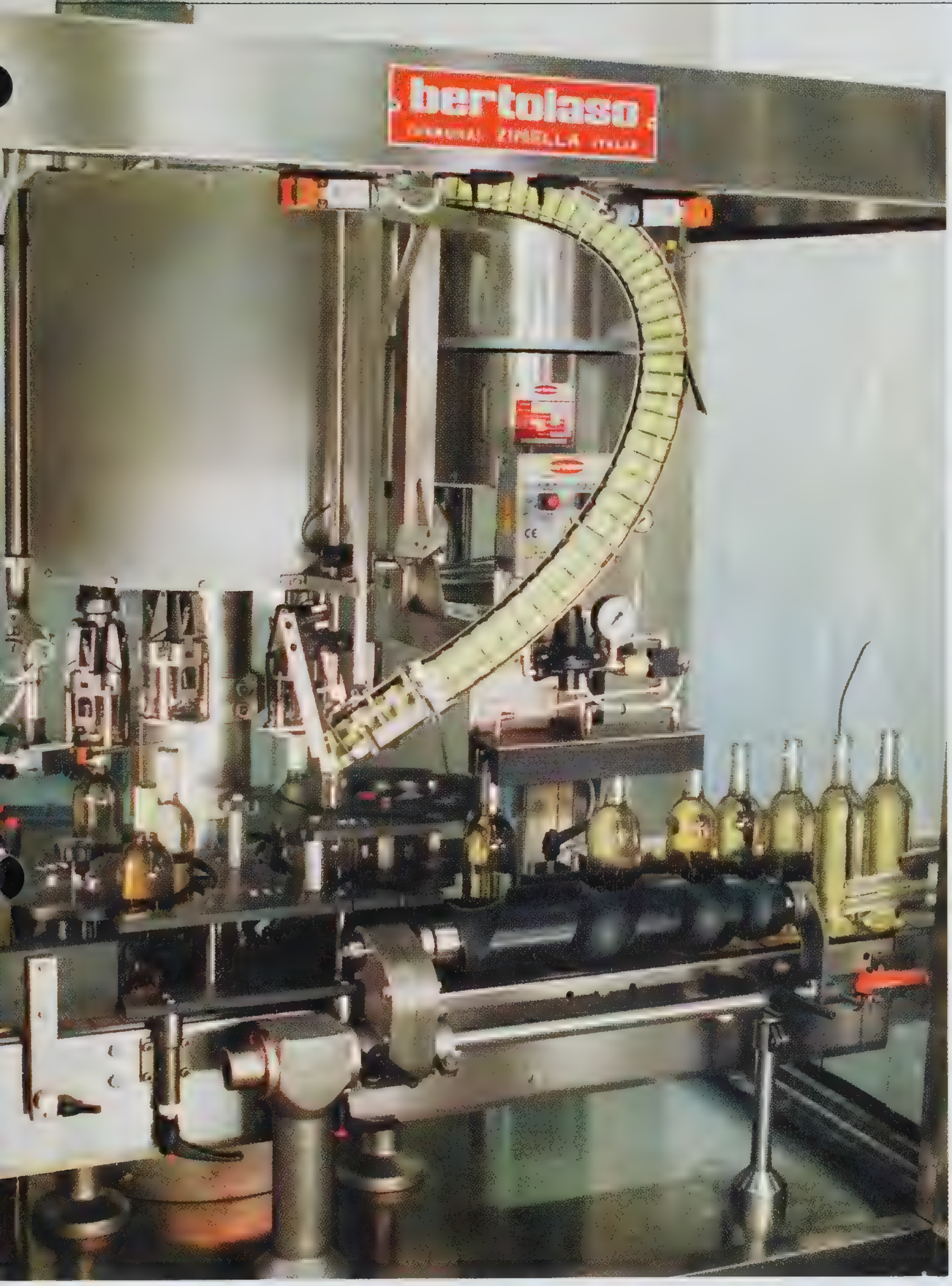

Sigma 604 ROPP capper, manufactured in Italy by Bertolaso and operating at Silverado Vineyards (Napa, CA), has a "no cap/no roll" feature, "pick & place" system to automatically orient a screwcap with positive placement on a bottle, and a patented infeed screw to handle a wide range of bottle diameters. This machine has four patented TF100/4 capping heads, and is equipped with an inert gas injection system (prior to capping), a VB40 vibrating distributor, and maximum capacity of 100 bottles per minute. Bertolaso is represented by ColloPack Solutions (Napa, CA).

BOTTLING UNDER SCREWCAPS

Quality control issues for premium wines

BY Henry Work

Plumpjack Winery (Oakville, CA) offered premium Cabernet Sauvignon in bottles sealed with screwcaps in the late 1990s. Since then, PlumpJack's continued success has opened a lot of eyes, and the premium wine industry has begun to consider use of screwcaps.

Another winery shifting to screwcaps is Hogue Cellars (Prosser, WA). David Forsyth (director of winemaking stated in June 2004 (after completing a 2½-year closure study), "Bottling our wines with screwcaps will yield tremendous benefits: elimination of cork taint, consistent and appropriate ageing, lower SO_2 levels at bottling, and greater ease in opening bottles."

Screwcaps, however, are not new. Threaded aluminum ROTE (Roll-on, tamper-evident) or ROPP (Roll-on, pilfer-proof) closures were introduced in the 1960s. Researchers at Dow Chemical in 1933 discovered polyvinylidene chloride, the main material in the liner-seal that is in contact with wine, subsequently branded as "Saran" and "Saranex" (Saran sandwiched between layers of polyethlylene or polyethylene-vinylacetate). When a tin/saran liner is used, it is the tin layer that creates a barrier to oxygen ingress.

Wineries such as E&J Gallo (Modesto, CA) have been producing wines with screwcap in their economy and beverage categories for more than 30 years, notes Mary Wagner, chief technical officer.

"In Finland, Norway, Sweden, and Switzerland, wine under screwcap has been popular for more than 30 years," reports George Thomson (Crown Cork/United Closures & Plastics [UCP] in the United Kingdom).

With an increasing demand for screwcaps, more suppliers are entering the marketplace. This report will examine quality control factors and standards for the three critical legs in screwcap usage: screwcap suppliers and manufacturers, critical factors in glass bottles, and screwcap application at bottling.

Suppliers / Manufacturers of screwcaps

Pechiney (now Alcan Packaging), with its Stelvin brand, was one of the first suppliers to offer a long skirt (30mm x 60 mm) screwcap for premium wines. Scott Laboratories offers the Alplast brand. More recent entries are Cork Supply USA with SAVin from Metal Closures Group in South Africa, Oeneo Closures (formerly Sabaté) with the S-Cap, G-3 Enterprises (exclusive U.S. manufacturer of Royal 90™), Richard's Packaging (representing Crown Cork/UCP), Alcoa, Auscap (Australia), and the Guala Closures Group.

Some of these suppliers are divisions of larger international closure groups, while others contract to have screwcaps made to their specifications. In most cases, the fabrication plants are already making closures for other food and beverage industries and abide by, or utilize, several quality control certifications.

Certifications include ISO-9000 (certified by the International Organization for Standardization), HACCP (Hazard Analysis and Critical Control Point) typically used for food and food product production, American FDA compliance, and European regulations, including those applicable to the use of heavy metals. Ask your supplier for current confirmation of these certifications.

"Closure liners must comply with U.S. FDA CFR 21 reg. 177.1210 and the internal coatings must comply with U.S. FDA CFR 21 reg. 175.300," explains George Crochiere, Crochiere & Associates, packaging consultants, (Pepperell, MA). "Compliance does not guarantee good flavor, sealing, or barrier properties."

While certifications and compliance activities are not an iron-clad guarantee against defects, they certainly minimize problems. Many winemakers agree with the assessment of Aron Hess, executive winemaker at Rex Hill, (Newburg, OR), who suggests that the few problems he has experienced have generally not been the fault of the cap manufacturer.

"Wineries should only obtain closures from manufacturers who produce screwcaps under statistical process control," notes Thomson (Crown Cork/UCP).

Manufacturing of screwcaps

"The manufacturing of aluminum screwcaps starts with the coating or painting process," says Crochiere. "The flat aluminum sheet has a total of two to five individual coatings applied to the inside and outside. The coatings provide corrosion protection, lubricity for manufacturing and removal torques, improved adhesion for the inks, and decorative color.

"The aluminum is cut into discs and drawn into the closure shape. Depending on the cap and process, this is accomplished in one to three operations; the result is a cap shell with smooth sides.

"If the cap is to have decoration or a logo applied, this is done next with inks and a clear protective varnish. In this process, each cap is handled, registered,

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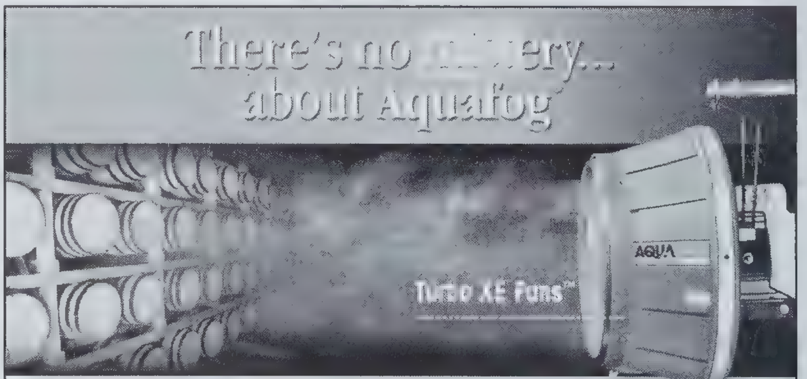

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and printed individually whereas short screwcaps (used on beer or water) are typically printed during the coating process.

"The last metal operation trims the cap to its specified length, applies the knurling and liner-retaining feature, and makes the cuts for the pilfer-band bridges (breakaway feature).

"The final manufacturing process is insertion of a liner; these are either provided as cut discs or as a roll of material that is cut in the insertion process.

"The screwcap manufacturer conducts quality checks at each stage of this process. Final quality control process should include but not be limited to: closure application, sealing, pilferband operation, removal torques, correct liner material, and coating and ink application, color, placement and adhesion."

Seal manufacturing processes and shipping

The actual sealing discs, and their layered materials, are normally made by companies other than the cap manufacturer. The seal material is made by a combination of extrusion, co-extrusion and/or lamination processes. The material is shipped to the cap manufacturer either in sheets, which the cap manufacturer cuts to size as they are inserted into the cap, or as pre-cut discs to save on shipping and scrap costs.

It is important to understand the potential areas for contamination in the supply chain of screwcaps and liners. As noted, the seals are normally manufactured in different plants from where the screwcap is made.

Trucks and containers carry all sorts of products and chemicals (some of them volatile), which could be absorbed by the plastics. Again, as part of the cap manufacturing process, inspection of incoming raw materials should be part of the quality control process. (More on this in the "Bottling line application" section below.)

Sealing material options / selection

"Seals are made to provide a compromise of resilient softness for sealing properties and barrier properties," says Crochiere, "to minimize oxygen ingress, carbonation loss, loss of volatiles and flavor neutrality; typically these are opposing properties for polymers. Seals are made in three different ways; formed in place PVC, single material discs, and multi-layer discs of resilient cushion layers and barrier material layers."

Most of the 30x60 closures have a multi-layer disk where the center cushion layer is a polyethylene foam of specific thickness and density (relating to hardness) and the surface barrier-layers made of one or more of polyethylene, PET (polyethylene-terephthalate, polyester), Saranex, Saran, aluminum, or tin-on-kraft. The liners that incorporate a layer of tin, coated with Saran, provide a barrier with very low oxygen-permeability. Those liners with

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barrier-layers of Saranex allow some oxygen ingress.

"The oxygen transmission rate for Saranex is only slightly greater than tin-saran or aluminum-saran," says Jim Peck, G-3 Enterprises (Modesto, CA).

"Each sealant material and configuration has its own sealing, flavor, and barrier properties," adds Crochiere. "Changes in closure and/or liner supply should be carefully evaluated. In addition to the sealant material, the closing conditions also affect the barrier properties as different closing conditions can increase the length and reliability of the seal on the bottle.

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Richards Packaging ROTE closure — Twin Fin wines

"Based on work started in the beer industry in 1982, the sealant industry has developed barrier materials and techniques to evaluate them under commercial conditions for oxygen ingress, carbonation loss, and the ingress of TCA, TeCA, and other undesirable contaminants. The methods are now being used for wine packaging.

"An oxygen permeability coefficient will tell you how many micro-grams of oxygen permeate through a given package component per day. Combined with the volume of the package, an ingress rate in ppb of total package oxygen per day for a closure/liner type, closing condition and bottle size can be determined. These units are the same as those used to measure oxygen levels at filling and can be added together to determine the total oxygen in the package from filling and ingress over time. Versions of this test are also used to evaluate the performance of closures when exposed to

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Table I: Oxygen permeability of various closures

Closure type	Oxygen Permeability Coefficient micrograms O_2/day through closure	Total Package Oxygen Ingress ppb/day in 750ml bottle
Agglomerated cork with discs	5.03	6.7
Natural cork – test 1	6.83	9.1
Natural cork – test 2	3.75	5.0
Natural cork – test 3	3.00	4.0
Natural cork – test 4	6.75	9.0
Synthetic cork type 1	11.63	15.5
Synthetic cork type 2A	7.88	10.5
Synthetic cork type 2B	5.70	7.6
Synthetic cork type 2C	13.88	18.5
Synthetic cork type 3A	7.50	10.0
Synthetic cork type 3B	14.25	19.0
Synthetic cork type 3C	8.25	11.0
Screwcap with Saranex top seal	0.03	0.040

abuses like warehouse stacking, transportation, temperature changes, or impact on the closure."

"Another term for oxygen permeability coefficient is oxygen transmission rate, which would include not only permeation but any micro-leakage," notes Jim Peck.

"When selecting a new closure and liner, a comparison of oxygen ingress coefficients or rates to existing closure types will help predict the shelf-life and development of the wine with the new closure," adds Crochiere. "In addition, comparison of TCA or TeCA barrier properties can minimize the risk of cellar or transportation contamination. Typically, the better the barrier properties, the higher the cost.

"A chart of oxygen permeability coefficients for some typical wine closure is in Table I. These numbers have been generated from numerous tests over the past seven years and should only be used as an indication of what is possible."

The choice between Saran/Tin or Saranex seals generally reflects the winemakers' decision on whether to seal the bottle completely for a short-lived wine, such as Sauvignon Blanc, Riesling, or Pinot Grigio, or to allow some permeability, for ageing red wines. However, both Patrick Pickett, (winemaker for Pepi, Oakville, CA), and Aron Hess, have observed relatively little difference in the actual taste of wines using either of these two seal types with whites or reds.

"It is a huge debate on how much oxygen," says Thomson (Crown Cork/UCP). "The technology is available; unfortunately Crown Cork/UCP does not have a fix on the quantities required over time."

Wineries using screwcaps are trying to get a "fix" on the right amount of oxygen for their various wines. Hogue uses the Saranex seal for both red and white wines, while John Conover (general manager at Plump Jack Winery),

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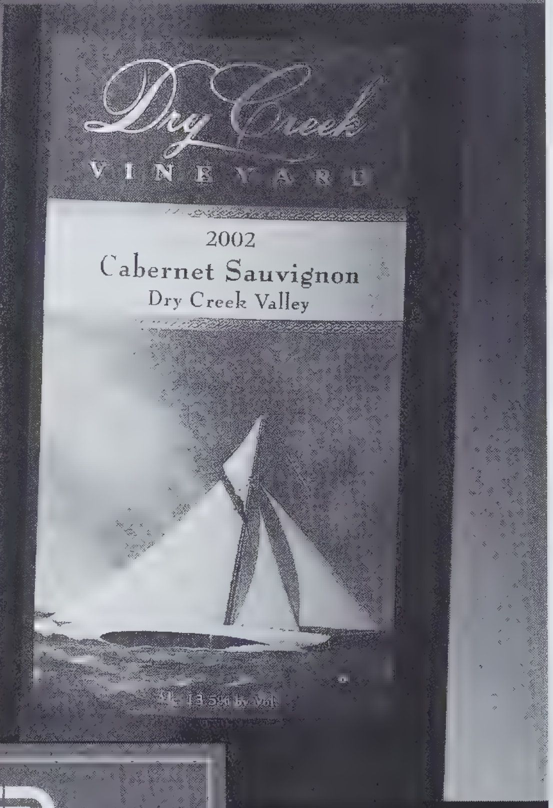

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Table II: Screwcap types matched to bottle finishes

Closure Type	Pressure Block or Reform Type (see text for explanation)	Glass neck finish specification
30x60	Flat – top seal only	BVS, BVP, GPI 1680
30x60	Partial reform – corner seal	BVS, BVP, GPI 1680
30x60	Full reform – top / side seal	BVS
30mm short flange	Flat or partial reform	GPI 1610
30mm long flange	Flat or partial reform	GPI 1615
30mm Champagne closure	Full reform – top / side seal	GPI 1660

reports using the Saran/Tin seal for their reds, and some of their white wines. All of which suggests that the Saran seal for whites and Saranex seal for reds guideline can have many exceptions.

Inspecting screwcaps

Your supplier should have an inspection procedure for all incoming products from its manufacturers. This should provide a second line of defense against possible manufacturing errors. All suppliers contacted for this report did have a receiving inspection procedure in place. These include checks for the cap artwork and colors, that the correct seal-disc has been properly inserted, and that the packaging integrity has been maintained. If you are using a new supplier, it would be worthwhile to ask what checks are included in their receiving inspection.

The distributor's inspection procedures should also include: inspection of the packaging for damage (especially crushed contents, but also rips and tears); any odd odors; sample inspection of the caps to ensure they conform to size, thickness, skirt length, and style; sampling of the seals to ensure they are the correct type and inserted correctly (since the layers in the saran/tin-type seals are not symmetrical, they must be inserted with the saran side to face the wine); proper printing, and embossing. Colors should match between the top and skirt (they are printed separately), and should match the customer's specifications. Break points (bridge line) must be properly perforated; and general cleanliness of the caps and their packaging must be assured.

Screwcaps and glass bottles

Not all screwcaps are compatible with all styles of glass bottles, and vice-versa. The bottle finish design and corresponding neck diameter must be compatible with the screwcap and

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closing equipment. Cap manufacturers and distributors want to inspect a bottle sample the winery proposes to use to make sure their cap will fit properly, or can supply design specifications for a glass manufacturer. Aron Hess emphasizes: "Screwcap manufacturers who do not insist on matching their cap to a specific bottle/finish tend to supply more problematical caps."

This problem was echoed by another winemaker, Tony Bish (Sacred Hill Wines in Hawke's Bay, New Zealand), who received a shipment of bottles with a slightly elliptical neck, some outside the range of specifications. The screwcap would not fully descend onto the bottle. The capping head would come down and impact the closure and tighten onto the bottle, resulting in many broken bridges on the cap, compromising the tamper-proofing aspects. The caps did seal correctly, but the result was unsatisfactory due to sharp edges where bridges were broken and unsightly appearance.

Newpak SAVin closure – Reds wine by Laurel Glen Vineyard

A different brand of screwcap worked better, because the caps had a slightly wider skirt to allow more caps to fully seat on the bottle-neck before the capping head was applied. Also, the inside surface of the caps was smoother and the reduced friction allowed caps to seat better. However, since the bottles were out-of-round due to forming irregularities, even this did not fully correct the problem.

The Sacred Hill problem was only solved by disgorging some bottles and re-bottling in new bottles within specifications. Given the tight tolerances required for a proper seal and tamper-proofing, all screwcap suppliers and winemakers recommend that great effort be taken to ensure that the screw-

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cap and glass bottle styles be absolutely compatible.

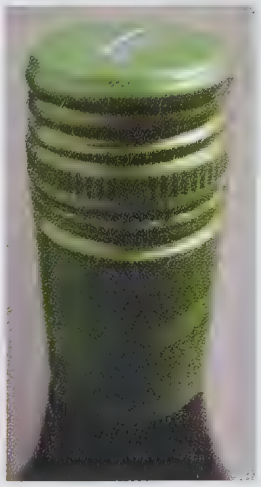
"Richards Packaging has had several experiences with matching of bottle and closure," reports Bob Boord. "The Glass Packaging Institute (GPI) provides neck finish specifications, but many small deviations have crept into bottle neck finishes over the years. In addition, molds wear. The result is that constant attention needs to be given to the proper matching up of neck finishes on bottles with the closure specifications.

"In one situation, a customer used seven different glass bottles. Analysis found that there were seven variations of the GPI neck finish, and some of those deviations were serious. In another situation, a glass manufacturer built new neck finish inserts, but the new specifications changed the fit of the closure on the bottle.

"Manufacturers of bottles and closures do not communicate well with each other, so it becomes important for the winery-buyer and the distributor salesperson to work together to provide bottle samples to the closure manufacturer for testing to assure good fit. Whenever a new bottle is introduced or existing bottle molds are rebuilt or modified, samples of all cavities should be sent to the screwcap manufacturer for analysis."

The actual sealing of the screwcap is achieved at the top of the outside rim radius of the glass bottle. Therefore, this rim must be smooth and correctly curved. The glass thread must start a specified distance below this rim to accommodate the seal.

"The holding power of the cap is achieved by the threads, while the pilfer-band locks the cap in place," explains Crochiere. In addition to the proper surfacing at the top edge, the thread and pilfer band ridge below the thread tolerances are relatively tight, thus the need for coordinating the bottle and cap specifications.



Scott Labs Alplast closure — Fusee wine by Don Sebastiani & Sons

Bottling line application

Prior to and at bottling, a number of inspections and checks must be made. Most of the caps are packaged bulk in plastic bags and shipped in cardboard

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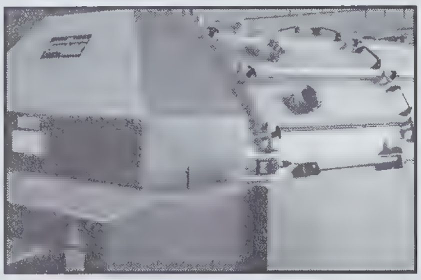

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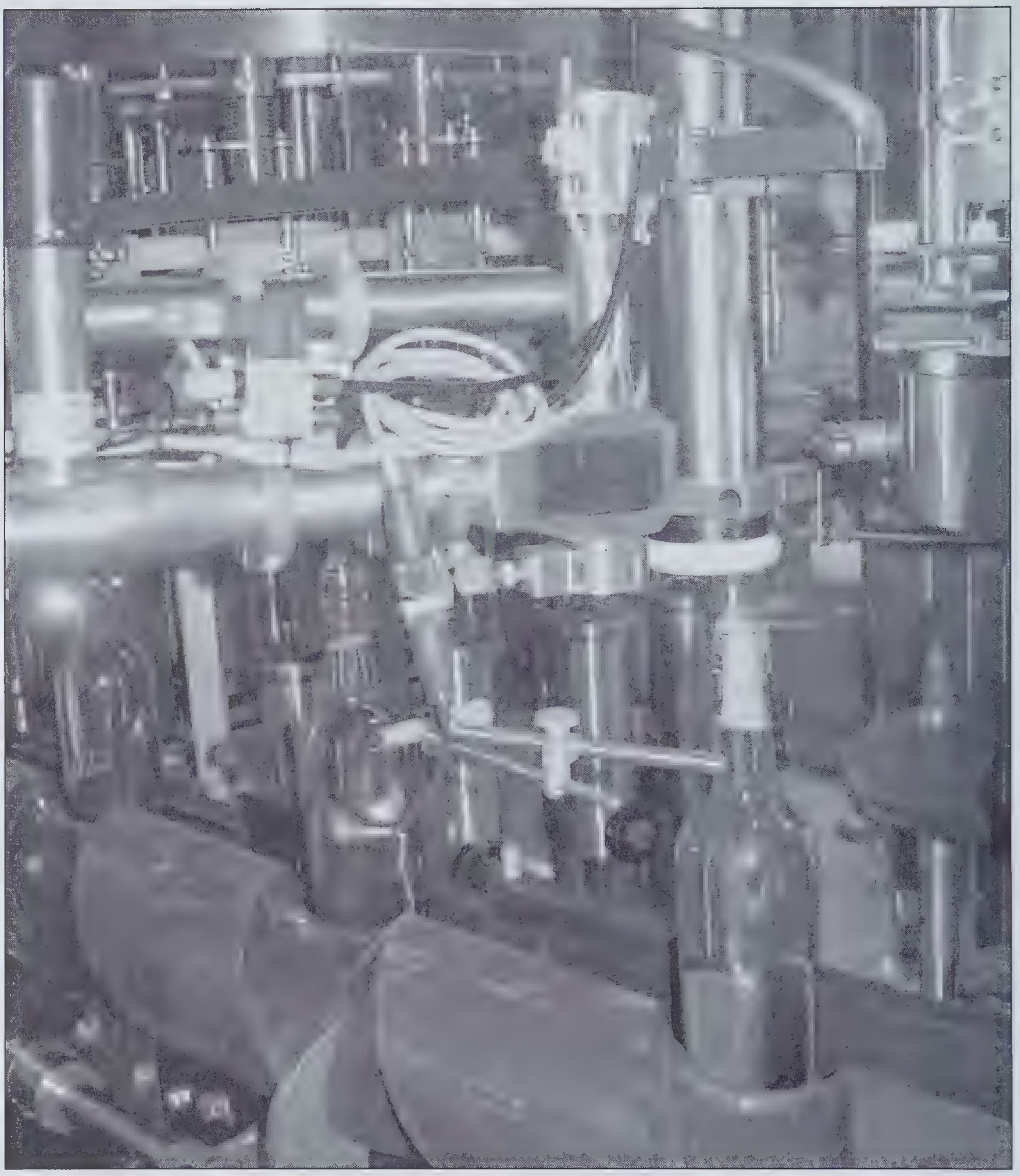


VBS International injection unit adds liquid nitrogen into bottles of Pepi Winery white wine to displace oxygen in the head space. "There must be some minimum positive pressure to remove oxygen in the cap sleeve," says Neal Schinske, sales/technical manager for VBS International. "However, with a residual screwcap bottle pressure above 5 psi, there may be a noticeable hissing sound when a consumer opens the bottle. A consumer might think that the wine purchased is a sparkling wine or is still fermenting, which would be perceived as a possible quality issue."

boxes. The boxes must not show any evidence of being crushed, which could dent or deform the caps; nor should the plastic be ripped or torn, in order to keep the caps clean and protect them from odors. Clean, dry storage in the winery is essential.

"Bottles should be inspected for straight and concentric necks in addition to dimensional checks to insure that the sealing area, threads, pilfer step and neck comply with specifications," says Crochiere. "Bottles should also be inspected for manufacturing imperfections or damage (glass flash or slivers at the mold-parting lines) that could result in unacceptable performance of the screwcap sealing system. Don't forget to check for cleanliness and off-odors in the bottles and cases."

Alignment of the capper is absolutely critical. Kristi Koford (winemaker at Napa Wine Company, Oakville, CA), notes that one screwcap manufacturer insists on inspecting the head set-up for first-time users. She appreciates this service since they have previously experienced a brand that wouldn't seat on the bottles and then jammed the capping machinery.

The capper is a complex piece of machinery with a precisely-shaped head (pressure block) and several sets of rollers designed to mold the screwcap in a specific manner. Precision springs apply a pressure of around 400 lbs. force ($28.12 kgf/cm^2$) to the pressure block. This squeezes and forms the screwcap on the bottle's top sealing edge, forming the seal. This part of the sealing is referred to as a reform or redraw. The capper should be set to the particular screwcap manufacturer's settings.

Wineries should consult with Alcoa, Zalkin, Silgan, Arol, Bertolaso or other capper manufacturers to determine top pressure in a capper.

"There are three general types/shapes of pressure blocks," explains Crochiere: "1) a flat surface that produces a top seal only, 2) a partial or slight curved block that produces a slight corner seal, and 3) a full reform that draws or wraps the closure and liner around the top of the glass and seals 1.5 to 2.0 mm down the outside of the bottle."

The rollers that form the threads need to be exactly aligned and moving at a speed that will allow them to be inserted and released at the proper time.

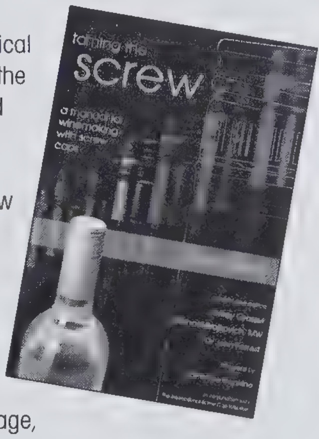
Steve Rasmussen (owner of S.L.O. Bottling Services), notes that the capper head needs to move slow enough in order to allow these rollers to accurately form the threads. If speed is essential, more heads should be installed.

The second set of rollers simultaneously crimps (undertucks) the aluminum closure under the pilfer ring and smooths the skirt to complete the seal and hold the cap in place. The head and screwcap manufacturers recommend specific pressures for each of these sets of rollers.

Another important factor is the head space to allow for wine expansion without creating excessive internal pressure in the sealed bottle. Generally, screwcap manufacturers suggest around 2% of the wine volume. This fill level should be checked periodically throughout the bottling process.

As more winemakers become familiar with using screwcaps, one current debate is on sparging with either nitrogen or CO_2 prior to cap placement, to displace any oxygen. Some winemakers and bottling line companies use nitrogen gas, while others are using liquid nitrogen. Patrick Pickett (Pepi Wines), uses liquid nitrogen that requires little time to displace the oxygen.

"The total packaging oxygen (TPO) exposure to the wine is the sum of the oxygen pickup during transfer to the filler," explains Crochiere, "pickup as the wine is being filled into the bottle, the oxygen added from the head space, and the oxygen ingress through the package (closure) during the life of the product. Typically the two largest con-



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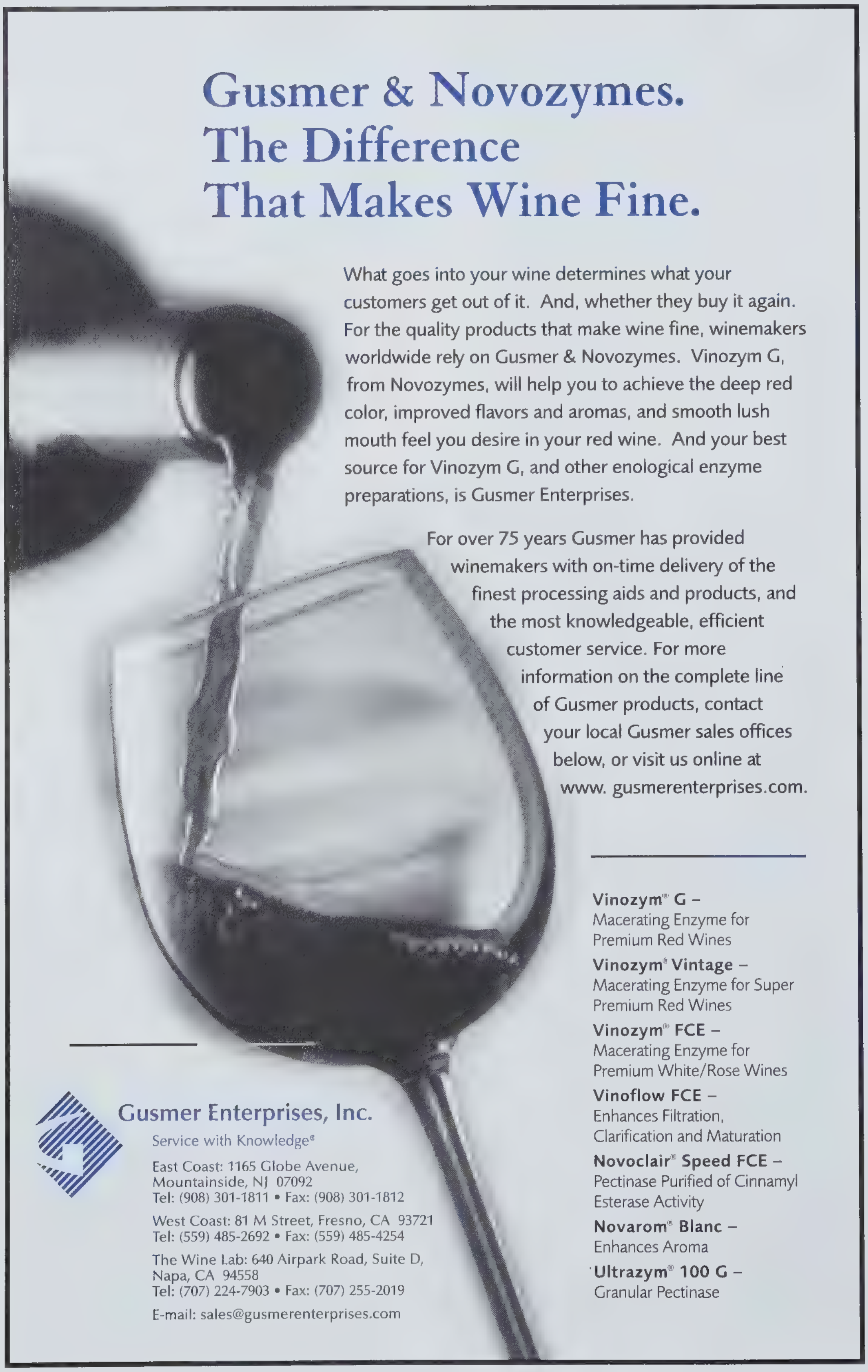
tributors are the head space and the ingress.”

Figure I illustrates the amount of oxygen added to the filled product as a function of volume of head space. The chart shows two relationships, one with a complete flush as with liquid nitrogen, the other with no flush.

“If you use inert gas,” adds Crochiere, “the head space flush will not be as thorough due to air turbulence and allowed time. When using liquid nitrogen, there should be excess added so that bottles are sealed with 10 to 15 psi nitrogen pressure.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“Selection of the sealing liner and optimum reform will minimize ingress as illustrated by the oxygen permeability coefficients and ingress rates in Table I. The use of inert gas to flush the empty bottle before filling (with or without alternating vacuum) would optimize the filling line for minimum oxygen pickup.”

Alcan/Pechiney Stelvin closure — Hogue Cellars

G3 Royal 90™ closure — Screw Kappa Napa wine

David Wright, production manager for Pacific Wine Partners (Gonzales, CA),

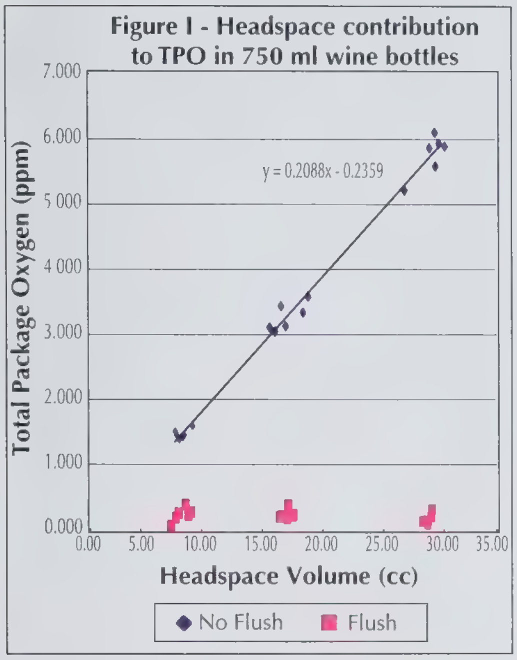


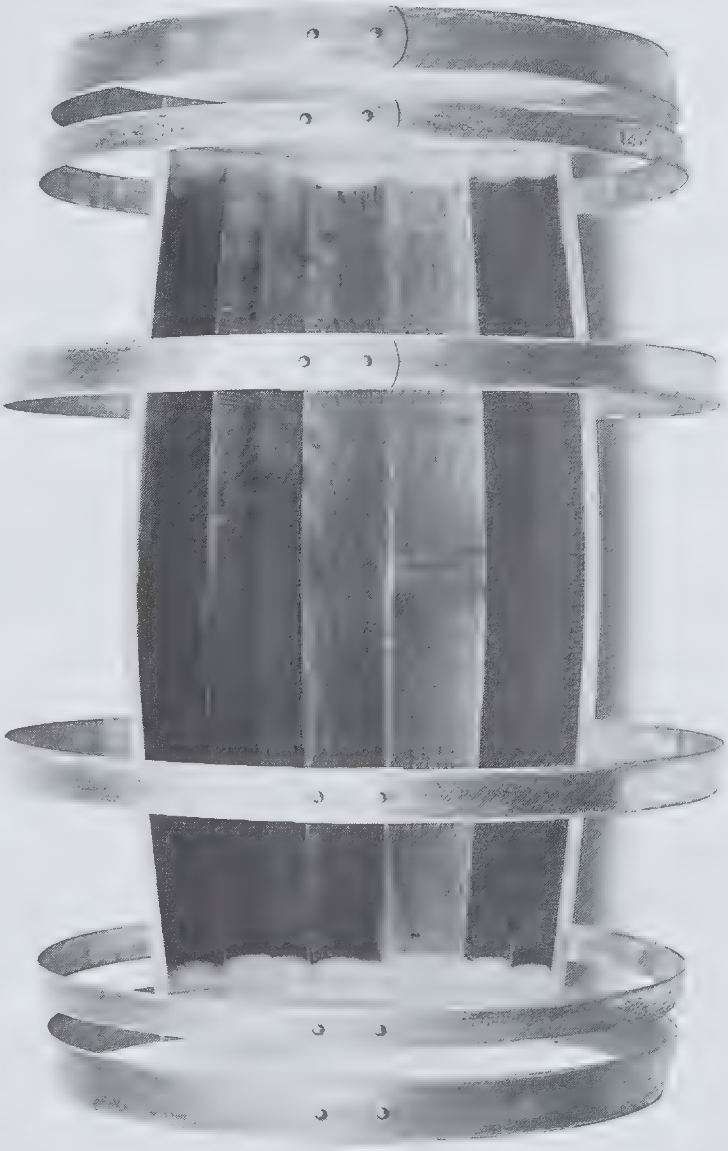
Figure I - Headspace contribution to TPO in 750 ml wine bottles

uses CO_2 which, being heavier, displaces oxygen. Hogue Cellar's quality supervisor, Mei Yeung, notes that because screwcaps allow for relatively large head space, when compared to cork closures, the use of nitrogen, carbon dioxide, or argon is necessary to remove the oxygen from that space. Hogue uses liquid nitrogen. On the bottling line, the gas (regardless of type), is delivered just after filling and before cap application.

Oeneo Closures S-cap closure — Badger Mountain Vineyard, WA

Quality control of the caps does vary. Jose Mendez, the bottling line supervisor for Ultima Mobile Bottling, has, on occasion, seen a difference in skirt lengths of 1 to 2 millimeters. The longer ones can block the cap feed. He also watches for the seal discs falling out of caps as they move through the cap feeding system.

After bottling, case storage is recommended at no more than three pallets high, in order to prevent excessive compression on the caps. PlumpJack Winery solves the problem by shipping bottles horizontally in six-bottle wooden boxes. Hogue Cellars stores screwcapped wine without pallets four-cases high for even distribution of vertical forces.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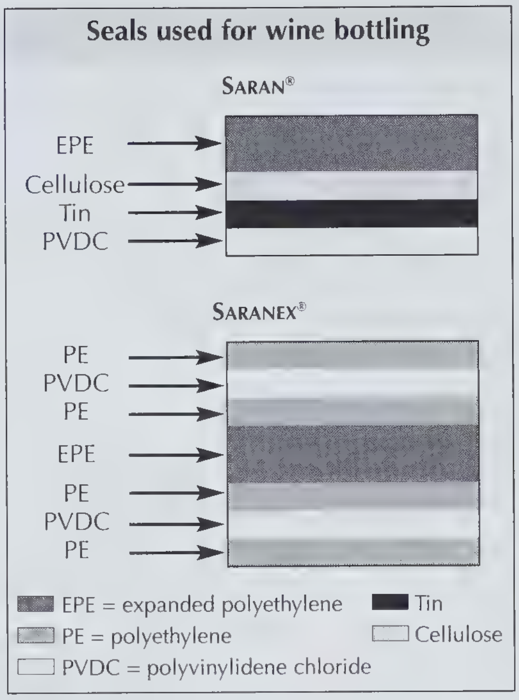
Seals used for wine bottling

Testing on bottling line

As a basic method to ensure that bottles are properly sealed, most suppliers recommend periodic testing of the torque required to remove a screwcap. Several supply a torque tester to accurately and easily perform this test. Frequency of this testing is up to the winery, although one bottle, every one to two hours per capper being used, is a commonly mentioned standard.

Wright suggests that the torque specifications should be in the range of 5 to 15 inch-pounds. The test is conducted with two twists. The initial twist breaks the seal and should be on the higher side of the range. The second breaks the aluminum "bridges" connecting the threaded portion to the lower skirt, and should be no less than the lower number in the range. (Normally the wine consumer would unseal and break the "bridges" with one motion.)

A pressure test is used by Wright to test the seal. This consists of injecting CO_2, to apply pressure into the bottle via a threaded needle, while the bottle is under water. As the pressure is increased, an

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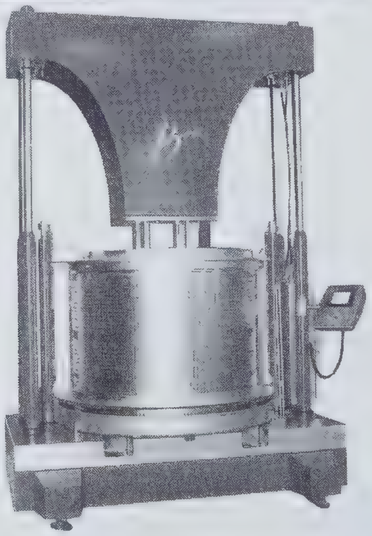
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operator watches for bubbles escaping from under the cap. Normally the cap should hold a minimum of 20 lbs/in^2 of pressure for still wines. Wright emphasizes, "This is an important test as the internal pressure in the head space of a bottle can vary drastically due to elevation and temperature changes."

"The Secure Seal Test (pressure test) injects any pressurized gas at a controlled rate into the bottle via a threaded piercing needle," says Crochiere. "The specification of 150 psi is for carbonated soft drinks, beers should hold about 100 psi, still products like wine only need a closure that holds 40 to 50 psi. This is the force required to compress the liner material and allow the air to vent. A closure that is applied incorrectly can leak at very low pressures."

Several companies supply testing equipment for these checks. Contact your screwcap supplier or these testing equipment suppliers: Secure Pak (www.secure-pak.com) or Dillon (www.quantrol.com).

Additionally, a bottling line worker should make a visual inspection of the caps; noting the smoothness of the threads, any deformation or bulges at the top, and a clean crimp line. When the top of the cap is removed, it should separate cleanly at the "bridges," with no torn or sharp edges to cut the opener's fingers.

"Inspection should also include the coatings and inks — the more decorated the cap, the more likely there will be paint and ink dust generated in the screwcap hopper," adds Crochiere. "This can be unsightly, but more important, the dust will collect inside the caps and contaminate the wine. In addition, check for coating lifting at the cut edges of the pilfer bridges and the bottom of the cap. Dark color caps show scratches much more than light color caps as the exposed aluminum makes a sharp contrast."

QC issues for further research

In 1999, Peter Godden and colleagues at the Australian Wine Research Institute (AWRI) undertook an extensive research project on closures for wine bottles — including the use of corks, synthetic corks, and screwcaps. One result of their testing

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was that screwcaps showed the least reduction in free SO_2 of all closures tested.[2]

Having noted a similar maintenance of SO_2 levels by screwcaps, several winemakers interviewed for this article including Shaun Richardson, vice president and winemaker at Clos Pegase (Calistoga, CA), are looking into the possibility of reducing the SO_2 level at bottling.

However, the AWRI closure research project also indicated, through sensory testing, that the screwcap closure had the highest "reduced" aroma. It was described as "struck flint" or rubbery.[1] The authors reporting the study subsequently note that, after 36 months in the bottle, the same wine sealed with the corks also exhibited similar aromas. Further exploration of the causes and/or relation between the SO_2 levels and reduced aromas issues will be required.

Perhaps associated with this reduction are the yet-to-be totally defined differences in permeability of sealing materials in discs of various screwcap brands. While Conover indicated that he does not want breathability with the PlumpJack Cabernets and hence uses the Saran/Tin seal, Richardson uses the Saran/Tin for the Clos Pegase Sauvignon Blanc wines, and Saranex disc seals for the Chardonnay, in order to allow some oxygenation during ageing. The jury appears to still be out on the issues of seals and wine type, with more experimentation and experience necessary.

Conclusion

Screwcaps have a history of use in many industries. They are relatively new as a premium wine closure, but have a long history of use with low-priced wines. The technology and materials are well-tested and appear to be suitable for wine. If winemakers make sure their caps and glass are compatible, are cautious with new suppliers, and test frequently with the first bottlings, screwcaps should have a positive impact on wine, by providing, as Patrick Pickett notes, "consistency bottle to bottle." ■

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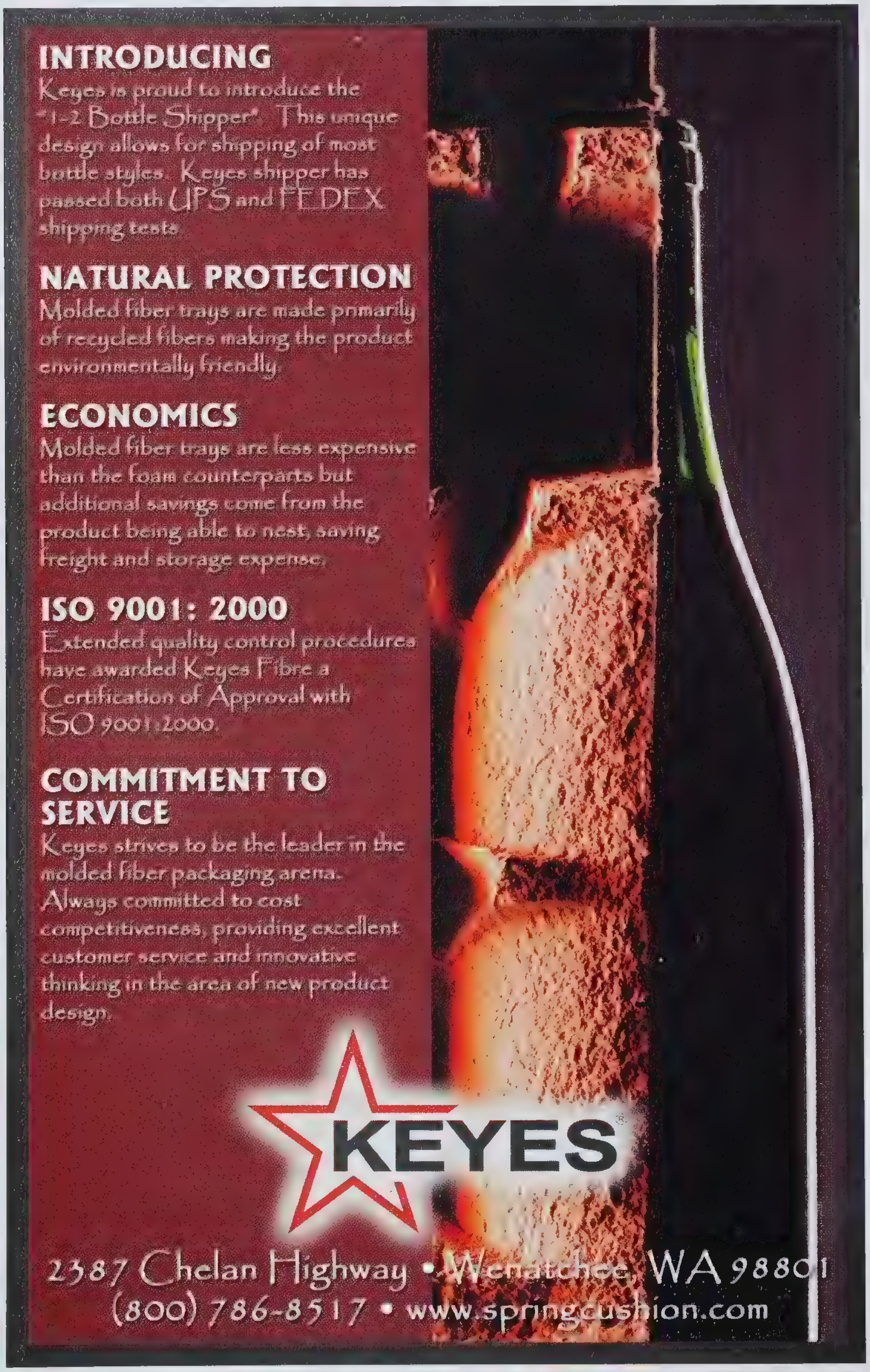

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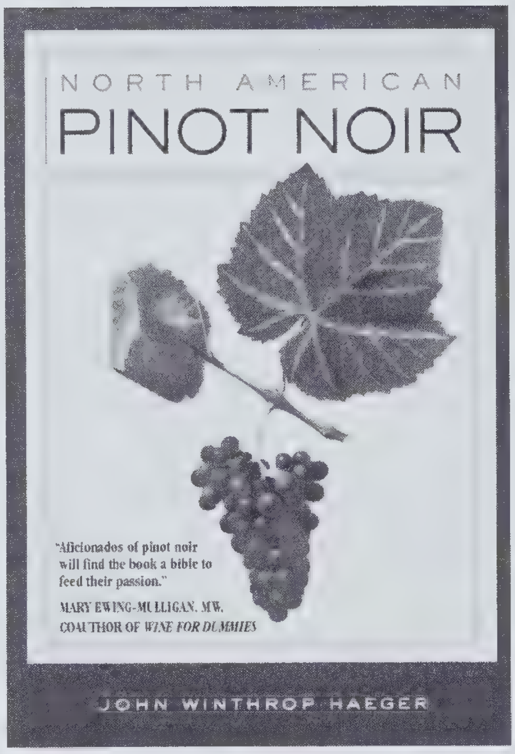
BOOK EXCERPT

EXCERPT FROM: NORTH AMERICAN PINOT NOIR

TIMING THE HARVEST

Deciding when to wait, and when to pick the grapes, is either the last element of grape farming or the first element of winemaking, depending on one's viewpoint. If consumers were better educated by wine writers, they would understand that this choice is, after site itself, the single most important determinant of a wine's quality *and its style,* and that no variety is more marked by this choice than Pinot Noir.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PINOT NOIR
"Aficionados of pinot noir will find the book a bible to feed their passion."
MARY EWING-MULLIGAN, MW, COAUTHOR OF WINE FOR DUMMIES
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A generation ago, we are told, winemakers picked "by the numbers." More accurately, a generation ago, winemakers waited by the cellar door and left growers to pick by the numbers. The relevant numbers measure sugar (expressed in degrees on the Brix scale) and acid (expressed both as grams per liter and as a logarithmic value called pH). While there is no evidence that the contemporary winegrower has discarded any of the tools available to measure these numbers, there is now a tendency to wax poetic about the "art" of picking wine grapes, especially about picking Pinot Noir.

The most common formulation is to say that one is picking by taste, meaning that the berries ought to taste good — to be sweet rather than sour, and not too astringent. But at least a dozen other indicators are also said to be in play: whether the stems taste green or ripe, whether the seeds taste nutty, whether the grape skin is just beginning to pucker, whether berries can be pulled away from their stems easily, and more.

Some winemakers say they have learned to "read flavors" from visual cues. Others pay careful attention to the vine, looking for signs that it has finished its work for the year and has "nothing more to give." Cessation of shoot-tip growth and leaves with autumnal colors are typical end-of-season indicators.

In many situations, of course, winemakers cannot have their druthers, however such druthers are determined. Most Oregon winemakers will pick early to avoid imminent rain, even if the flavors or the numbers are not ideal.

In high-latitude areas where long Indian summers are rare, grapes sometimes get picked less than optimally ripe, just because temperatures are falling fast and the growing season is over — the alternative could be to produce ice wine. Conversely, in some parts of California, a brewing September or early October heat wave can launch the picking crews early — in this case the alternative could be wines with overripe, pruny flavors.

There are logistical complexities. Picking crews are not always available on the precise day they are desired, and vineyards do not always ripen evenly, necessitating multiple passes through the vineyards, days or even weeks apart. Typically, in most of California, save for Salinas Valley, the southern Central Coast, and the true Sonoma Coast in cool years, and in Oregon in warm, dry years, most Pinot Noir is picked when the vintner chooses — unconstrained by Mother Nature.

Back now to the numbers. Grapes picked at less than 23° Brix will produce a finished wine containing less than 12.5% alcohol, unless sugar is added to the must. Grapes picked much above 26° Brix will yield a wine containing more than 14.4% alcohol, unless something is done to remove or dilute the alcohol. These numbers pretty much bracket the acceptable range for North American Pinot Noir. Pinots in the lower half of the range are usually perceived as lighter and sometimes as more elegant wines; those with more alcohol are usually perceived as bigger and richer.

In Oregon, it is perfectly permissible to add sugar, which reinforces the winemaker's inclination to pick early. In 1981, harvest at 21° Brix was normal, to beat the rain; in 1984 "decent" wine was made from grapes "salvaged" at just 18.5° Brix. In 1986 and 1987, Oregon vintners picked Pinot again at 21° Brix, but this time (unusually) to avoid overripeness owing to a California-style heat wave. In all cases, even with chaptalization, the resulting wines were near the lighter end of the Pinot Noir spectrum.

Andre Tchelistcheff used to argue, in the 1970s, that Californians should pick Pinot "at 22.5° to 23° Brix," to be sure of avoiding Pinot's "tendency to raisin up." But in California today, and in other North American regions when the weather permits, the picking norm is 24° to 26° Brix, which is why many California Pinot Noirs clock in above 14% alcohol.

The Ojai Vineyard's Adam Tolmach argues that 24° is always "plenty" sugar-wise, and that having to wait until the sugars reach 25.5° "is a clear sign that you are dealing with grapes planted in the wrong spot. The coolest sites," he explains, "can be picked at lower sugars because they have had longer to mature on the vine, but conversely you can also wait longer, because you are not as concerned about escalating pH. But basically you have to pick the warmer climate Pinot Noirs with too much sugar to achieve properly ripe flavors."

In fact, winegrowers rarely say how ripe the fruit is when they actually pick it. Some winemakers pick above 26° Brix, making the argument that "full flavor development" demands the late pick and high sugars. To fix the resulting wine, however, requires voodoo. Water additions to dilute the must are common, though rarely admitted. In extreme cases, the wine may even be chemically or physically dealcoholized. This practice is so controversial that it is generally debated only off the record.

Dealcoholization technologies usually involve resorting to third parties, who will process a batch of wine, or of grape must, to remove part of the alcohol. Only a few firms do this, and they are *very* tight-lipped about their clients. On the one hand, it is clear that "bigger" wines — whether Pinot Noir or some other variety — show better in comparative tastings and are rewarded with higher scores, and this is often *simply* because of their size, and not because they are more flavorful. This tendency has driven many Oregon producers, who displayed a stylistic preference for elegant, medium-weight wines in the 1980s, to press the picking envelope when they can and employ their own forms of voodoo to obtain more concentration.

On the other hand, some winemakers have begun to worry that fruit really is getting picked too ripe. Part of the problem, according to some viticulturists, is that younger, healthier vineyards, impeccably farmed and planted to virus-free vines, actually ripen sugar-wise faster than older, virused selections, throwing the high sugar versus full flavor dichotomy into bold relief. The alleged ability of Dijon clones to produce fuller flavors at lower sugars does not seem to compensate. No less than Tim Mondavi is concerned. "We don't sell leaves, vines, or grapes," he says, "we sell wine. I worry that we are harvesting wine that would be better characterized as port."

Full flavor development

"Full flavor development" has become such a mantra among Pinot growers during the past decade that it makes sense to pause briefly to be sure we understand what is meant. The phrase *full flavor development* is

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often used interchangeably with the terms *physiological ripeness* and *physiological maturity*, though Stag's Leap's Warren Winiarski — not a Pinot Noir grower by any means, but incontestably successful as a vintner — prefers to define full physiological ripeness as "equal outcomes in all clusters," overcoming what he calls "the vine's natural tendency to create a hierarchy for clusters and ripeness."

The full flavor idea is that ripeness as measured by classical metrics associated with sugar and pH can sometimes precede ripeness as measured by the berry's color, texture, and flavor. And flavor, which ought to be the key, is actually tricky, because there is no clear and simple connection between berry flavors and the flavors that emerge in the finished wine.

It is important to realize that "full flavors" — whatever this really means — are very much on the palate of the taster. In the first place, when several producers share fruit from a single, more or less homogeneous block of a single vineyard — as, for example, at Bien Nacido and Pisoni — these producers typically pick on quite different dates, because their definitions of full flavor are not the same.

At Bien Nacido, Lane Tanner is famous for being an early picker; other vintners say they *begin* to watch the fruit after Tanner has *finished* picking. By contrast, Siduri is a notoriously late picker, especially at Pisoni.

In the second place, some flavors give way to others as the ripening process proceeds. Black fruit flavors typically emerge after red fruit flavors, for example, though *terroir* can make grapes taste redder or blacker independently of their degree of ripeness. Also, some flavors are more intense than others, and more intense flavors and aromas can easily overpower those of lesser "size" or intensity.

Very deep fruit and strong spice can cover up, sometimes permanently, more delicate floral properties. Compost can cover up mushrooms and underbrush. James Hall (see Patz & Hall profile in part II) argues persuasively that pure and simple flavor development is overrated as a picking criterion. Since most late-season flavor development is simply a perception of declining acids, "allowing more flavors to be noticed," it follows that "most vineyards that are picked only on flavors are almost always picked overripe."

The bottom line: full flavor development is not objective or absolute; it reflects a vintner's stylistic preferences. In the worst case, it can even reflect a vintner's appetite for critical acclaim, or his view of consumers' tastes. ■

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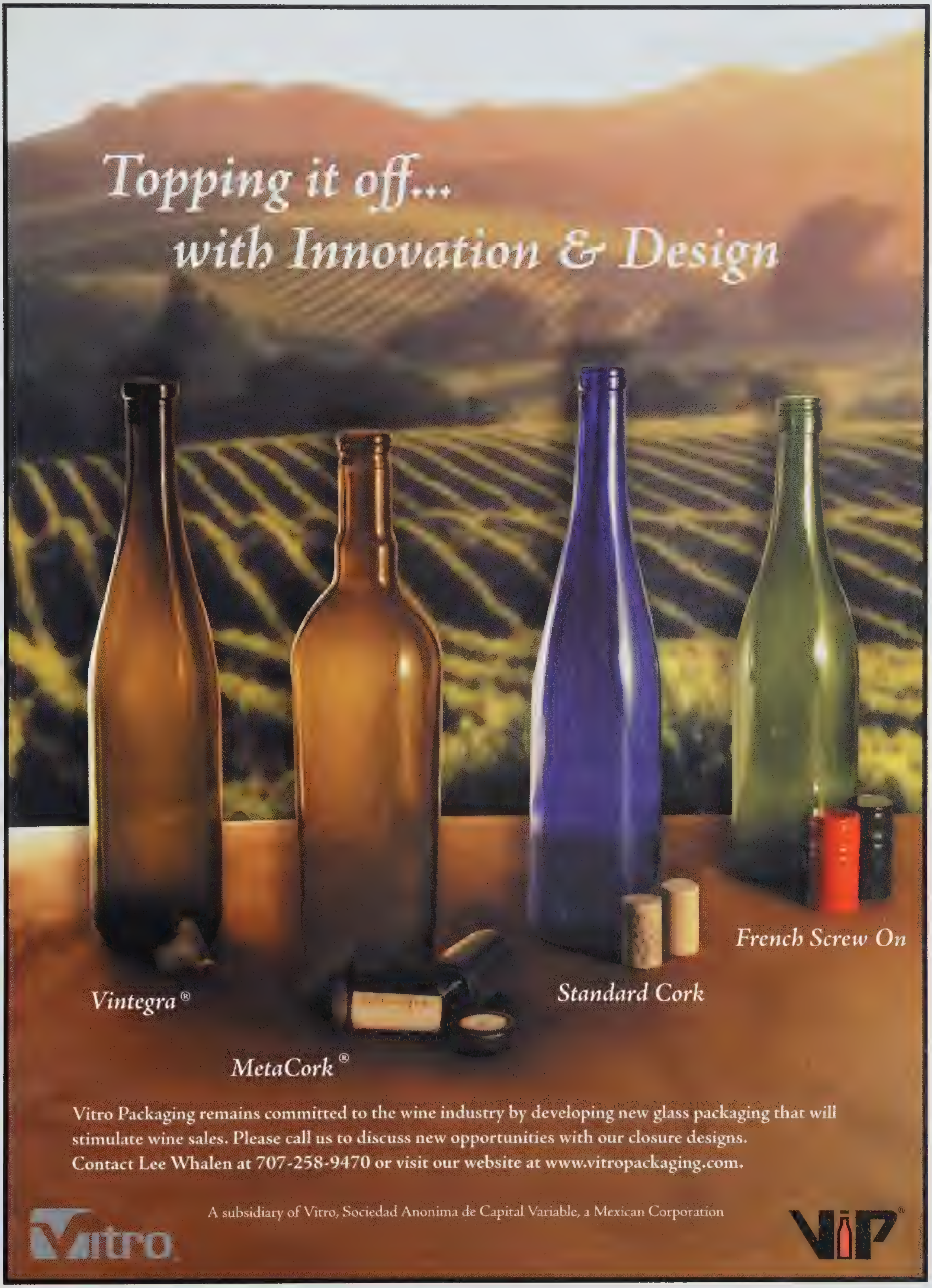

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Anderson Valley Pinot Noir and the Sense of Place

BY Ted Lemon,
Littorai Wines
Sebastopol, CA

The following is adapted from a presentation at the Anderson Valley Pinot Noir Festival, May 20, 2005.

Before I begin, I would like to note that the following is a round-about way of addressing the question of the characteristics of Anderson Valley Pinot Noir compared to Pinot Noir from other areas. I hope my remarks will help to frame the conversation. My wife and partner, Heidi, and I would also like to express our gratitude and appreciation for the hard work of Dr. Edmeades, Tony Husch, and Ted Bennett and Deborah Cahn of Navarro Vineyards. Without these pioneers there would be no grapes in Anderson Valley, CA.

There are only two kinds of wine in the world: wines of process and wines of place. This fundamental distinction is essential to understanding wine today.

Wines of process take several forms. There are generic or varietally-labeled wines from large regions. There are wines such as non-vintage champagne or non-vintage port. While these may come from a region, vintage plays little role and sourcing can vary significantly over the years.

A third example of wines of process are those whose production techniques overwhelm the ability of site to express itself. Wines that undergo excessive new oak exposure, concentration machines, reverse osmosis or spinning cone would qualify. As would wines made from grapes harvested at elevated Brix levels. For wines harvested at elevated Brix levels, jammy and pruney aromas and production of higher alcohols during fermentation inhibit the expression of site.

Wines of process can come from a place but wines of place cannot come from process. In the early stage of the drift from place to process, one or a few of these techniques may be used and site may still remain visible. These techniques act like filters on a camera. Place one upon the other and over time or in aggregate they slowly obscure the view of place, until finally only the process remains.

I would not argue that there is something inherently superior about tradition. Nothing can stifle creativity and improvement more than slavish obedience to tradition. Some of the greatest wines in the world have resulted from innovation, whether 10 years ago or 1,000.

Here is an example: Does the production of Cabernet Sauvignon aged in small new barrels in Italy represent an evolution towards wines of process rather than wines of place? Only much time and much tasting will tell.

In the course of innovation all winemakers ought to ask themselves the fundamental question of whether the innovation serves the end of process or the end of place. Unfortunately, few winemakers do.

Our universities do a generally poor job of educating winemakers in the culture of wine. They stick only to the science, *i.e.* the process. Additionally, most winemakers face commercial and managerial constraints that prevent them from practicing their vocation as independent craftsmen.

The recent "Mondovino" film is an exercise in enthusiasm gone awry rather than a thoughtful exploration of the role of place in wine. But perhaps that was not the intent of the film. It does show the "terroirists" to be passionate philosophers of the agrarian life. The globalists have no philosophy other than the philosophy of business, of market share, of "jewels" in a portfolio, as Michael Mondavi so eloquently states in the movie.

The jewel is a perfect metaphor for the globalist approach. It is the objectification of wine. Once a jewel is produced, it cannot be changed or modified. It is as hard as, well, yes, a diamond. Real winegrowing is anything but this. It is dirty, difficult work, constantly subject to review and change. So too, are the wines after bottling.

As I reflect on this, I am reminded of our young winemakers, recently graduated with degrees in enology but with limited understanding of the philosophy of place. I realized that what is so obvious to me, something I live and breathe every day, is invisible to most of our young winemakers and to the globalists.

It is not that they reject the notion of terroir. After all, most of these people chose Napa Valley or the Santa Rita Hills (Santa Barbara County) for some reason.

It is not that terroir is a language they do not understand. A language we do not understand can be heard and acknowledged.

Despite the obsessive pursuit of profitability and market share, they are not intentionally destroying wine.

Rather, it is as if they were creatures living in three dimensions when some of us live in four.

In the case of place-based winemaking, these people have absolutely no idea that the fourth dimension lies right before their eyes. They have never pruned a vine in the blustery winters of the Willamette Valley (OR) or run a plow over the red sticky soils of Bonnes Mares (Burgundy, France). While these activities are not prerequisites for an intuitive and deep understanding of terroir, they certainly help.

But one need not come from generations of vignerons to be a place-based winemaker. There are plenty of geriatric estates making wines of process or simply bad wines. Nor do venerable terroir-based estates necessarily produce better wines. They do; however, deserve a modicum of respect. Or at least they did. If they are now producing wines of process to please the critics, then in my book, they have lost their right to the "gimme."

Now you may ask, what in the world does the above meditation have to do with purchasing grapes from Anderson Valley? I think the answer should be obvious. All of us gathered here today know that Anderson Valley has a tremendous sense of place.

When I first returned to California from Burgundy in the mid-1980s, I tasted every American Pinot Noir I could get my hands on; this included Anderson Valley wines both young and older. There were wines of merit. There were also wines that were less inspiring. Yet in all of the Anderson Valley wines there was a spark, faint at times, but unmistakable. That spark was the echo of the joyous fruit expression so integral to the wines of this place.

In those days, growers in Anderson Valley were not compensated enough to warrant investments in the fine vineyard husbandry that has become the standard today. Into the mid-1980s, even among California wineries growing their own fruit, techniques such as leaf removal, clonal selection, vertical trellising, hedging, and green harvesting were only just beginning to be implemented. Small wonder then that many of the wines only hinted at what was possible here.

When we began Littorai Wines in 1993, we made our first Pinot Noir from Anderson Valley grapes. We were very fortunate to find Rich Savoy as a grower-partner. Rich was innovative. With the help of Steve

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Williams and Steve Tylicki, he had planted his vineyard on Deer Meadows Road above Boonville with three clones of Pinot Noir with a vertical, split-canopy trellis system.

Savoy agreed to a highly unusual contract with Littorai. We purchased one acre of fruit on a by-the-acre basis. To indicate that we believed this concept and these techniques would produce wines dramatically different from those of the past, we gave the wine the name: One Acre. This is one of the oldest, continuous by-the-acre contracts in California.

Let's try to further define the spark that is the genius of Anderson Valley Pinot Noir. There are dramatic differences in flavor profile from site to site. Some vineyards produce wines of significant tannin structure, others wines that are quite soft and gentle. There are large differences in malic acid, total acidity, and pH, according to vineyard site. I find no Anderson Valley-wide commonality here.

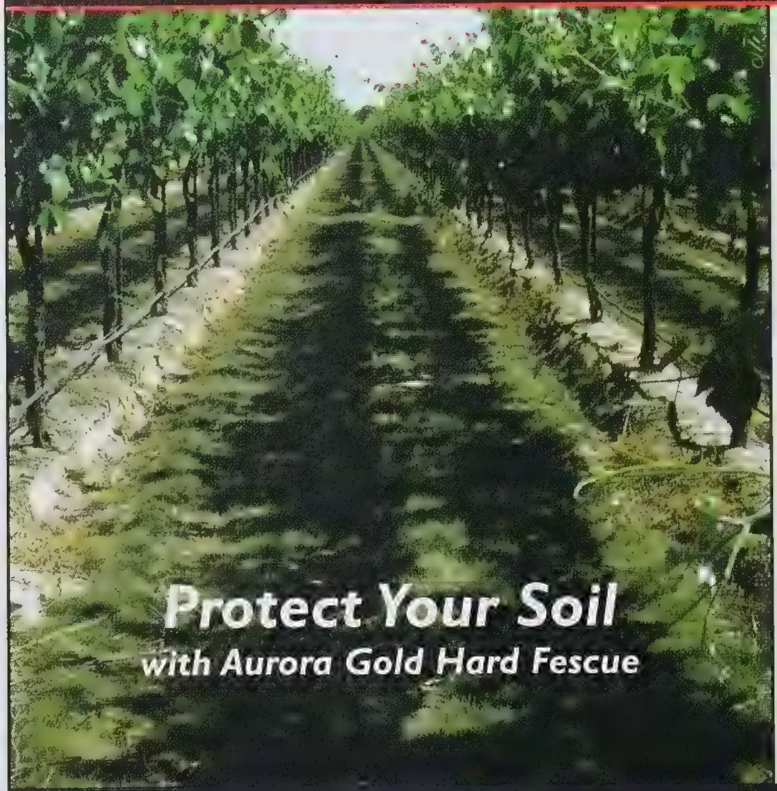
Ripening dates vary widely according to elevation, exposure, or location between Boonville and Floodgate. It is impossible to categorize the flavor profile differences between parts of the valley. There can be as much difference between two sites at the Boonville end as there can be from Boonville to Floodgate.

What unites the wines of Anderson Valley is their purity of fruit expression. In their youth, the wines are dominated by blackberry, raspberry, red plum, and all the nuances in the cherry spectrum. Lavender and rose petal aromas can be present to a lesser degree. These notes can completely dominate any secondary bouquet.

That leads to the second characteristic of Anderson Valley Pinot Noirs. Unless the wine is made using whole clusters, it needs time to express secondary aromas such as earthy or spice tones. If one were to make a Burgundian comparison for Anderson Valley (and I generally find these comparisons of limited value), the fruit expression of the wines reminds me most of Chambolle Musigny.

In parting, I would like to encourage the Anderson Valley Winegrowers Association to explore innovative tools to nurture and nourish the sense of place. The remoteness of Anderson Valley has spared it from the rapid change of Napa and Sonoma. Yet foreigners, both "craftsmen" and globalists, will gradually make their presence felt here, too. Let us work with them. Let us educate them. Let us educate ourselves so that we may all see, cherish and cultivate the fourth dimension of which I have spoken. ■

ELIMINATE THE COMPETITION



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PART ONE

Winegrowing of Pinot Noir in Russian River Valley

BY Don Blackburn, Nicolas Cantacuzene

This survey of winegrowers in the Russian River Valley American Viticultural Area (AVA) in Sonoma County, CA, examines the important elements of soil and climate in production of high quality Pinot Noir. Part II will report the winemaking process through bottling.

The Russian River AVA has become a respected Pinot Noir producing area, benefitting not only from its intrinsic affinity for the grape, but also from consumers' new enthusiasm for Pinot Noir.

The Russian River AVA stretches from Healdsburg south along the Russian River and beyond to Sebastopol and west toward the Pacific Ocean as far as the coastal foothills near Guerneville. On the east, it is bordered by the Chalk Hill and Alexander Valley AVAs.

Climate

Merry Edwards, winemaker/owner of Merry Edwards Vineyards (Windsor), describes what makes the Russian River climate unique. "We have the fog coming from the San Francisco Bay and the fog coming from the Russian River, and it surrounds the area and holds the temperature down.

"Also, we have a strong diurnal variation. The day-to-night temperature swing in summer can be quite extreme. Depending where you are in Russian River Valley, it could be as much as 40° to 50°F. The diurnal variation is what sets up the metabolic pathway to create more phenolic substances in the developing grape. This is very important because what you find in the texture of Russian River Valley wine is completely different from what you find in other areas."

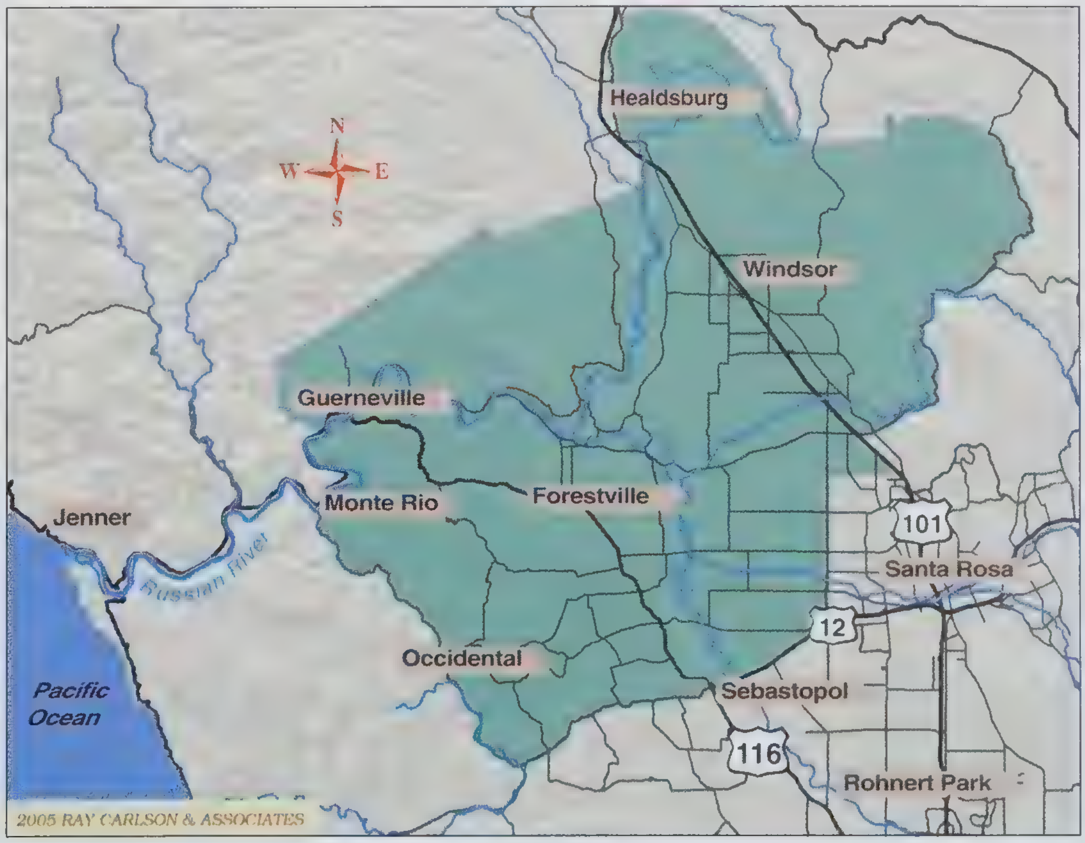
Steve Dutton of Dutton Ranch (Graton) says, "During harvest, fog plays a great role in the timing of ripeness. If the fog is there, the quality is going to be better." His colleague **Al Steele** adds, "What you want here is the fog that is held in by an inversion layer. This is somewhat typical of early to mid-summer. It burns off by 10 or 11AM , and it's not all that wet because of the inversion layer, so it slows the ripening process."

Dave Munksgard (winemaker at Iron Horse Vineyard, Sebastopol) agrees, "Fog has a tendency to slow things down. You rarely see fog at 1 PM; it usually burns off about 11 AM. It slows down the warming up of the day and brings the sunlight later in the day. This seems especially true during harvest. I really love it because it lengthens the cool picking part of the morning."

RRV soils

As the continent of North America moves west and grinds the Pacific Ocean floor beneath it, the mountain-building process has pushed the land upward and created a jumbling of surface strata, which in the Russian River, leads to an intermingling of soil textures. Dutton's family has been growing grapes in the area for two generations.

"There are two types of soil in our region of the Russian River Valley," Dutton says. "Sebastopol fine sandy loam, and Goldridge fine sandy loam. The difference has more to do with where the clay starts in the soil profile. In Goldridge, the clay is much closer to the surface, while in Sebastopol soil, there is more topsoil above the clay layer." Steele adds, "Steve's dad (Warren Dutton) called the eroded



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Goldridge the 'Sebastopol' series. It has a redder structure."

Growers debate whether the clay component is significant more because of its physical properties or its chemical resources. Dutton holds the former view: "Clay is important because it holds the water, but 90% of the vineyards we have planted on Goldridge soils lack something. They are usually deficient in potassium, and we are always feeding them micro-nutrients, such as magnesium and boron."

Bob Cabral, winemaker at Williams Selyem (Healdsburg), values the clay in the soils for the nutrients it offers. "Both of clay's contributions are equally important," he says, "but we can simulate water-holding with irrigation. Many people consider those rich soils, down on the sandy loam where it's flat, to be poor compared to the hillside where there is more clay content. However, the Rochiolis (Healdsburg), have proven over the years that with these nice sandy loam soils (5 to 10 feet deep), which lie over 40 feet of gravel, you can still produce a pretty good wine.

"It depends on the rootstock planted, which is important because some rootstocks have more vertical roots, others have more horizontal roots. More horizontal rootstocks like 3309P can be water-controlled more easily, thus balancing the vines better. With deficit irrigation between berry set and verasion, we harvest small berries that give the wine more depth and concentration."

According to **Greg Lafollette**, winemaker and co-owner of Tandem Winery (Sebastopol), "The more vigorous soils that have better mixtures of loam and sand and clay have good water-holding capacity, which is why they have more vigor and larger berries. Those kinds of soils tend to produce more fruit-forward wines that can be softer and more immediately drinkable. On hillside soils, which are quite sparse and make the vine struggle more, you get much smaller berries."

Lafollette feels that soil amendments are helpful at planting. "It's best to minimize the need for additional nutritional amendments by choosing, at the outset, the optimal rootstocks, clones, trellis, and planting density. After all, you can only amend soil so much."

Kirk Lokka, former vineyard manager at Sonoma Cutrer, now manages the vineyard at Brice Jones' new winery at Gold Ridge Vineyard outside Sebastopol. "A fabulous thing about Goldridge soil is that it's workable. You can run a disk through, and it comes out beautifully; it is a farmer's soil. No soil is perfect, though. Goldridge soils lack in magnesium and phosphorous, and they are terribly acidic.

"The pH is typically 5.5, and we had some soils that were pH 4.9. When you initially plant the vineyard, you'll add between 10 and 20 tons per acre of lime. We tend to use dolomite lime, which has a higher magnesium ratio, because these soils are naturally low in magnesium.

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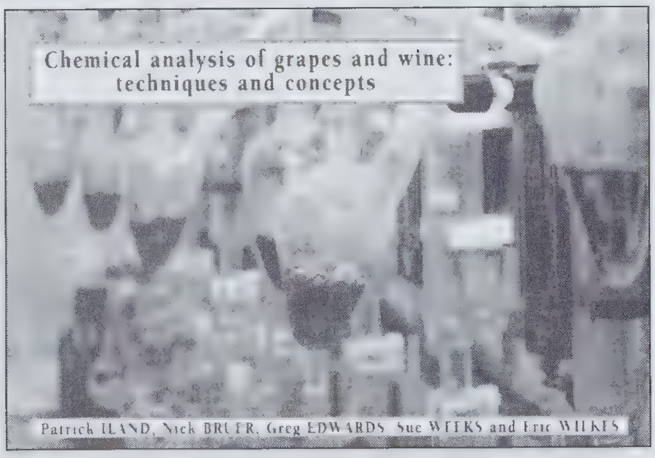
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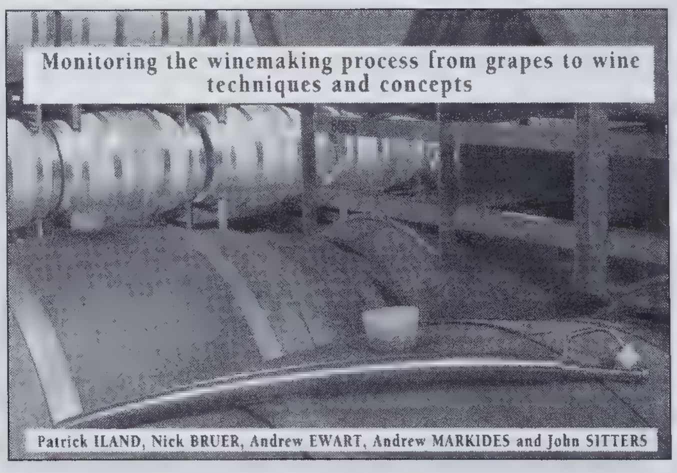
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Patrick ILAND, Nick BRUER, Andrew EWART, Andrew MARKIDES and John SITTERS

Then, when you get into a three-year rotation, you are adding three to five tons per acre every three years. We try to maintain the pH somewhere near 6.0. We also sometimes have to add boron or iron. The soils are rich in iron, but the vines can't take up the iron, because these are very charged soils, so you have to supplement them with iron.

"The farther you go down the slope, the higher the sand content in the soil. Clay is very dense and doesn't move very well, and this particular clay doesn't erode like the sandier soils. What you will see if you look at the hilltops along the ridge is that the soils are very red on top of the hills. Then, as you come off those hills, they get lighter and lighter in color as you go down. That sand layer gets deeper and deeper farther down the slope. In the valley bottoms below these gullies, the soil is loamier still, because there is moisture there longer. You get more plant growth down there and higher organic matter."

Marty Hedlund is vineyard manager at Dehlinger Winery (Sebastopol). "I have taken some soil samples and checked the pH levels, and they are appreciably lower in hilltops. We also have aluminum issues in the soil and get aluminum toxicity with lower pH (5.5 and lower), which has a profound effect on vigor. So, prior to planting, we check it, and if necessary, we lime the soil. In an existing vineyard, we add gypsum, which doesn't change the pH of the soil, but it 'bumps' aluminum off the roots and makes the soil a more hospitable environment for the vines. The sulfate from the gypsum forms a complex with the aluminum which renders the aluminum non-toxic."

The Dehlinger vineyard is divided into soil-specific, color-coded areas. Hedlund continues, "We micro-manage based on these different zones. Within each block, we have color zones, created using the forest service color system of red, yellow, and green. Red on hilltops where the vines are a little more stressed, prone to drying out sooner. Yellow in the middle of the slope, where it is not quit so dry, and there is a little more canopy with medium vigor. At the bottom of the hill, we painted stakes green in a more vigorous area with typically lighter and deeper soil. The hilltop soils tend to be redder, and the lower soils are typically lighter.

"Geologists call this a 'truncated soil profile,' which means that, through thousands and thousands of years, the topsoil has eroded away and exposed the lower soil profile. We keep everything separate according to vineyard blocks and track the quality of each lot of wine. Generally, wine from sandy soils tends to be more fruity and accessible early on, and the tannin structures are different. Our reserve wines tend to come from hilltop areas."

Grape physiology

Most Russian River producers prefer close vine spacing, single-curtain upright canopy, and modest yield.

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Lafollette reflects the technical bent of many winegrowers. "Here are the three most important aspects of berry physiology from a wine quality standpoint: first, pollenization and locule formation, where more seeds correspond to larger berries; second is the number of cells per berry, which equals cell division; and third is cell expansion where larger cells per berry produce larger, tighter berries, which result in a different wine style than you will have with nice open clusters with small berries, thicker skin, and more surface area.

"If you are farming for an $8 Pinot bottle price, you want to irrigate during cell division. If you want to put a satisfying, fruity wine on the dinner table that everybody can afford, you have to farm for bottle price just like you have to tailor your winemaking techniques for bottle price — that is really important."

Water availability

Cabral observes that vineyard irrigation has become a presumed element of most new plantings. "I think that most people who have any kind of water available will plan on irrigating, though I have taken the opposite approach on our estate. I am looking to use as little water as necessary to maintain or improve wine quality. I think regulators are going to consider taking some of this water from us eventually.

"They are beginning to cut down the flow of the Russian River. Everybody here along the aquifer has water use permits with the state. Eventually, the state of California will take it away from us, so they can sell more to Marin County. It is going to become a valuable resource here. We may have to turn in our PG&E logs, so they know how many acre feet we are using."

Cabral anticipates a time when the state will regulate how many acre feet of water can be used. "Yes, and I'm including frost protection also. They are talking about limiting frost water, so you couldn't start using water until May 1. It may take my lifetime before it happens, but I have seen this in Sonoma County; water is becoming more of a premium."

While government reallocation of water resources may put vineyards at risk to frost, viticulturists may discover that reducing the quantity of water going to vines in the spring is conducive to wine quality. Cabral adds, "By doing deficit irrigation trials and not irrigating until veraison, I have seen some improved flavor and fruit composition. At veraison, we start to meter water into the vines."

Clones

Edwards has seen several generations of clones gain acceptance. "Growers in the Russian River AVA have become very enamored with the Dijon clones. At the same time, they are going back and looking at which clones work best for the

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Russian River AVA. The Martini clone is quite good; we also have Pommard and the Swan selection. Those are the good older ones. We can't have all Dijon clones; we want to have some old and some new."

Ripening

Though "hang time" is widely perceived as a quality-conducive factor, some vintners and growers feel that what really matters is the group of environmental conditions impinging on the end of the grape's maturation cycle, rather than the number of days grapes hang on the vine.

Fred Scherrer, owner/winemaker of Scherrer Winery (Sebastopol) says, "I tend to agree with that view. My favorite vintages are the ones where we closed out gracefully, which are generally the later vintages. I think it's because there are less severe heat spikes."

Another point has attracted much more attention — the optimal degree of ripeness and the dilemma of high alcohol. Scherrer continues, "In the early 1990s, I advocated delaying harvest, not looking so much at Brix. In vintages like 1993, 1995, and 1996 where phenolic development lagged behind sugar accumulation, we let the grapes hang a little longer in order to get the desired flavors. Basically, the longer we let stuff hang, the softer the angles, and the deeper the fruit. You can harvest a little later and have a little softer, rounder, gushier wine with more fruit and less greenness.

"However, at 26° or 27° Brix, you might have a wine that doesn't have enough angles, not enough lift and verve. You get less of the red fruit and more of the darker fruits.

"Ideally, I would like to see 24° Brix, but I see that rarely with Pinot Noir in this area recently. I am looking at the overall balance in my mouth; it has to have a little bit of a zip to it. Tannin and acidity with red varieties, you can trade off one for the other, to some degree. In Pinot Noir however, you need sufficient bright acidity to balance moderately soft tannins and properly frame the flavors."

Hedlund adds: "It's been a long time since we have had wine below 14.5% alcohol. Generally, we are between 14 to 14.5%. Before we were able to do night picking, grapes would be picked all day. The difference in Brix between harvesting in the dark when it's cold, compared to picking in the heat of the day with the dehydration loss, can be dramatic. When you pick hot grapes, you get higher sugars and higher alcohols. Of course, you can go too far the other way; too little alcohol and you have no body."

Lokka sees a trend that appears to be peaking. "I think, over the last two years, the majority of winemakers hit the extreme and now we are starting to roll back. We used to pick Pinot Noir in the early 1980s at 22° to 23° Brix, and winemakers loved it, not knowing what they could have at 25° to 26° Brix. With the advent of the Burgundian copying, winemakers started to take those sugars

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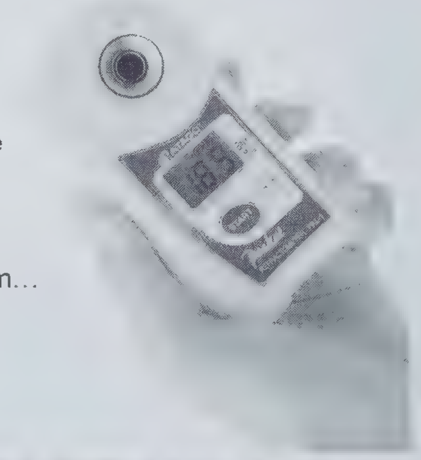

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up to 24º to 25º. They kept increasing Brix to 1º Brix each year, until they started picking at 27º to 28º Brix. There isn't any compensation for the grower. The contracts are changing; we will have to put in a dehydration factor."

Steele says that some winemakers go overboard: "They can't see the forest for the trees. When grapes are physiologically ripe, generally everything has brown seeds and the pulp is segregating itself, but not every berry can be that way. If you try to achieve that, and you can, but when it happens, it's at 28º Brix. I think there are people who are probably going backwards a little bit; there is going to be a reaction. The reaction will come when it costs wineries an arm and a leg to buy the grapes."

Dutton agrees with Lokka that contracts have to change. "If you pick at 25º Brix, it's a set price, but if you pick at 26º, it should be 10% more, and if you pick at 27º, it should be 20% more. I think the acreage deal is the fairest.

"We're trying to come up with a fair price per acre. We are going to do these tasks and for that we are hoping — depending on the history of the vineyard — to yield three tons per acre. That's the average it has been, and the winery is going to pay an enhanced amount for that."

Cabral adds, "Our alcohols have definitely gone up through the life of Williams-Selyem Winery. I am not as much concerned about the sugar as I am concerned about the pH and the acid and how they balance in your mouth, even in the raw juice.

"With the Dijon selections, when I am looking at seeds in the warmer areas, they don't get golden brown like a Pommard or a Martini or a Wente selection. You can get them nice and brown, but that is usually around 24.5º to 25.5º Brix. With the Dijon clones, if you wait to that stage, you have a diminishing curve in the flavor profile."

Conclusions

Viticulture in Russian River Valley seems to be undergoing two transitions.

The clonal make-up of the vineyards is changing gradually, as growers invest in improvements. New clones appear and old clones are re-evaluated. Replantings and new plantings, due to the high cost, will likely follow the wine market.

The same linkage applies to another, more controversial current transition, that of alcohol levels and degree of ripeness. Winemakers are becoming aware that a decade of picking at high sugars has influenced wine styles and consumer impressions. Wines are well-received, yet some winemakers are wondering what price we pay for intensity? ■

See Part II in September/October-2005 **PWV** *on winemaking of Russian River AVA Pinot Noir.*

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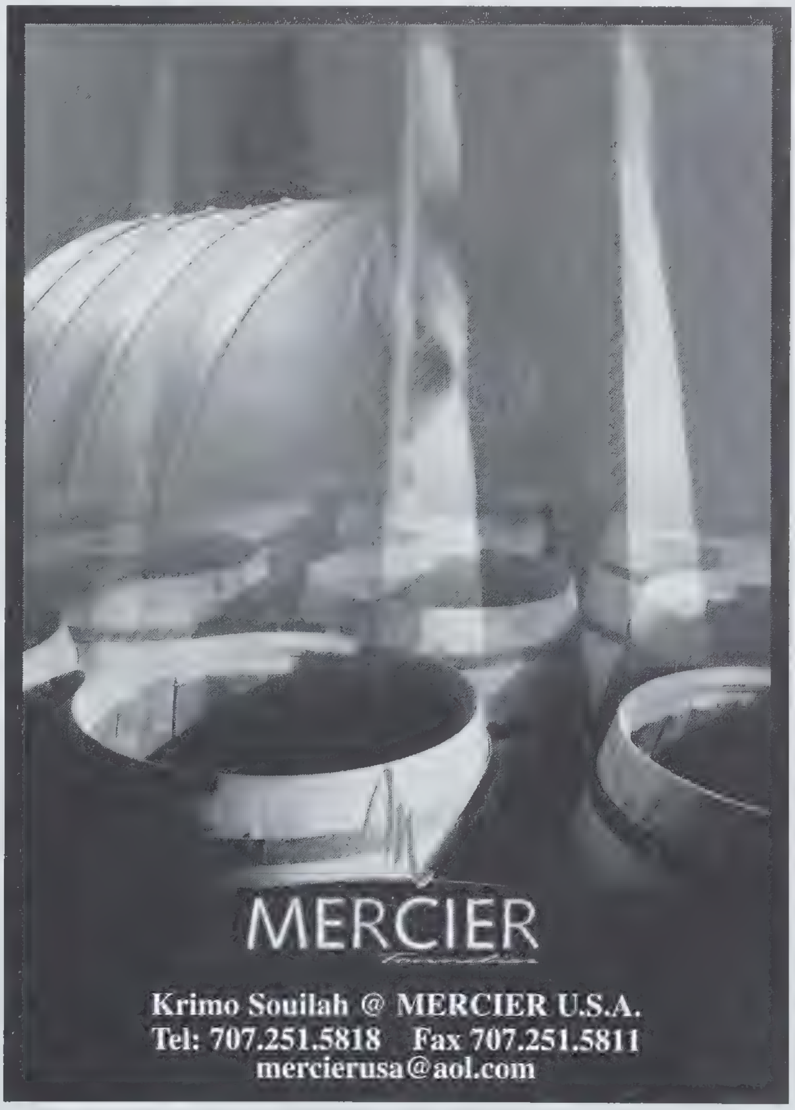

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WINERY/WHOLESALER RELATIONSHIP

Ten don'ts to increase sales

NEWLEVEL
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BY Michelle Rowell,
NewLevel Group,
Napa, CA

Managing wholesalers is a challenging task for many wineries today, as portfolios swell in size and the number of distributors continues to decline. Although there is no simple solution to overcoming this hurdle, there are some basic principles that can help wineries increase their sales through this tier.

Based on my past experience as a sales manager and my daily interaction with wholesalers for wineries on a consulting basis today, I have compiled a list of 10 do's and 10 don'ts that can help wineries manage distributors more effectively and, as a result, grow their wholesale volume. The 10 actionable do's were presented in the May/June–2005 ***PWV***. Below is a cautionary list of what *not* to do, which can be every bit as important.

1 *DON'T* EXPECT YOUR WHOLESALER'S REPS TO PAY CLOSE ATTENTION TO *YOUR* BRAND *(SHOCKER!)*

When I was a distributor rep, I represented a relatively modest portfolio. There were only about 1,200 different wines in it at that time, although now it's quite a bit larger. The best account that I called on would only have time to taste a maximum of six wines during each weekly visit.

Reps show wines about 46 weeks a year, assuming two weeks vacation and the fact that you can't really show new wines past November, if even that late. Let's do the math: 6 x 46 = 276. At most, I could expect to show 23% of my portfolio to my best accounts in one year. Then there are the accounts that don't need to be seen every week, or who don't want to taste every week.

Showing wines to accounts and hoping they'll buy is very much the "push" mentality of wine sales. As portfolios grow, the probability that your brand will get "pushed" by one rep over the course of the year will decline. This is why wholesaler reps don't (or can't) — do as much selling for our brands as we'd all like.

One of the best ways to leverage a distributor sales force is to have your wine be top-of-mind when an account flags a hole in their set or wine list that needs to be filled. If a buyer says, "I need a new Chardonnay by the glass," or "I need to fill out my Syrah selection," you want your brand to be the first one that comes to the rep's mind.

Ten do's

1. **DO** strive to understand your wholesaler.
2. **DO** present your brand's sales and marketing strategy and plan to your wholesaler, along with directions on how to implement it.
3. **DO** price your wine right the first time.
4. **DO** keep lines of communication open and easy.
5. **DO** consider mentoring distributor salespeople.
6. **DO** be very nice to all of the people who work for your distributor — at every level.
7. **DO** know how to be a salesperson yourself.
8. **DO** take time to review, understand, and act upon your monthly reports.
9. **DO** make sure that you have a clear, compelling and concise brand message to impress upon your wholesalers.
10. **DO** Pull as well as Push.

See May/June–2005 ***PWV*** *for Part I, page 31.*

How do you do that? Here's where you go back to some of the *Do's* in Part I: Be nice to them, mentor them, and communicate with them.

2 *DON'T* THINK BEING ON QUOTA WILL WIN YOU ANY FRIENDS AT YOUR WHOLESALER.

First of all, don't hang your hat on the idea that your wholesalers will put your wine on quota or focus for a given month or quarter, unless you are a very significant brand with some clout. But don't fret — being on "focus" or "quota" rarely creates any strong relationships with the wholesaler reps, neither does it lead to sustainable sales.

More often than not, reps have to call in favors to move quota wines — and no one likes to have to use up their favors. Or worse: If they have no favors left to use, do you want to be the brand for which the rep was called to the mat because he didn't sell five cases of your wine? But how can you get reps to sell your wine if it's not on quota? Here's an idea…

3 *DON'T* BE STINGY WITH SAMPLES.

My favorite suppliers when I was a wholesale rep were the wineries that gave a bottle to every salesperson at the distributor upon the release of a new wine. Shafer Vineyards used to do this, maybe they still do. I remember receiving a bottle of the 1994 Hillside Select to show to my customers. It didn't come out of my small sample budget, and I didn't really need it to sell my allocation of that wine. But did I appreciate it? Did it give me the warm fuzzies about the supplier? Yes!

Sometimes wineries worry that free samples won't go to accounts, or that they won't be able to track them. Here are two ways to counter that: First of all, give reps a caveat that if they accept the free sample, they are required to send you an email telling you which accounts sampled that bottle. Or, for the more time pressed, don't worry about it.

Let's say they took your wine home and drank it over the weekend with friends. If they liked that wine they will go out and sell it on Monday. "Hey," they'll say to their accounts, "I had a bottle of ______ Estate this weekend and it was awesome!" As we know, a lot of wine sales are based on third party endorsements.

Wine almost always needs to be tasted in order to be purchased, so wineries should facilitate that in any way possible. You know what your cost of goods is — this is not an expensive way to get your wine into the hands of buyers.

Instead of paying a stack of chargebacks for samples every month, consider shipping cases to your wholesaler with their orders where possible. You can do the math for your brand, but it may actually be less expensive to give every rep a 100% free bottle from your inventory than it is to pay a 50% chargeback on your wholesaler's laid-in pricing.

With distributors cutting reps' sample budgets, the probability becomes lower that your wine will be shown. Why take the risk? Ship them sample cases and hand out the bottles at a sales meeting. Speaking of which…

4 *DON'T* MAKE DISTRIBUTOR SALESPEOPLE SNOOZE THROUGH LENGTHY FRIDAY MEETING PRESENTATIONS.

The shorter you can be, the better. Ask your distributor management and reps who the best meeting presenters are and get a feel for best practices in terms of what kind of presentation is the most effective to each wholesaler. Roar in like a lion, waking them up; give them information that will truly help them do their jobs and help your wines, and finish before your time is up. Expend your entire day's energy supply in those 12 minutes.

Not only do you want to leave an impression, you also want to ingratiate yourself to the reps by respecting their time. Chances are they have will-calls they still have to make. Many have a long way to travel home after the meetings. And frankly, you have other things to do, too!

Communicate no more than three important things — it's been proven that that's all anyone can retain on a topic anyway. Presentations are not about quantity, they are about quality. Make them fun, upbeat, and above all — *brief!*

5 *DON'T* MICRO-MANAGE YOUR DISTRIBUTOR ON AN ACCOUNT-BY-ACCOUNT BASIS, AND DON'T GET HUNG UP ON ON/OFF PREMISE SPLITS.

This doesn't mean that target lists aren't a good idea, but you run the risk of hurting sales by dictating where cases are sold as opposed to giving the wholesaler some latitude in where they can make placements. Leave the micro-management of accounts to your salespeople, and instead explain *types* of accounts to your wholesaler. Focus on explaining the types of food, or the clientele, that you envision supporting your brand, and let the distributor do his thing.

As far as on/off splits are concerned, the 80/20 rule is, in my opinion, dead. I could go off on a tangent about how I feel that off-premise in many ways is better for brand-building than on-premise, but that's a discussion for another day (maybe over a glass of Zinfandel). The main point is that instead of focusing on the number of retailers, focus on the quality of those retailers, and talk about the types of accounts instead of the number of accounts.

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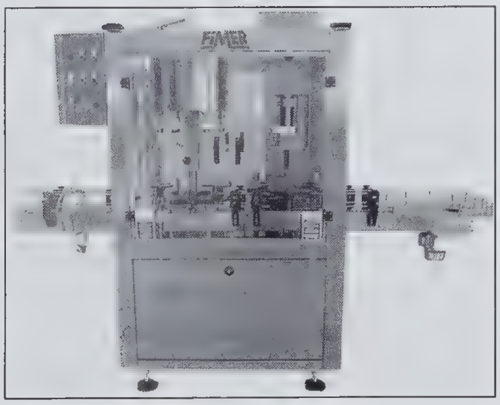

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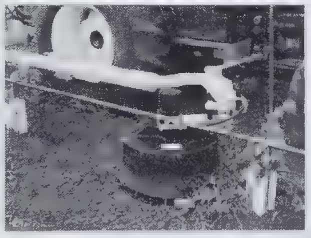

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One quick last word: If you want to be in the "big name" independent retailers who move a lot of volume, such as the Wine Club or Sam's, don't be surprised if your price is lower than you would like it to be, and don't blame your wholesaler if you wanted to be placed there. Speaking of pricing…

6 *DON'T* CREATE PROGRAMS AND PRICING THAT WON'T BRING YOU SUSTAINABLE RELATIONSHIPS OR BUSINESS.

This puts distributor salespeople in a tough spot. We spend a lot of time worrying about what consumers will think if our product prices fluctuate and the impact that has on brand image. But what about how this fluctuation impacts the relationship between wholesalers and their accounts?

Classic scenario: A wholesale price drops 30% one day seemingly out of the blue, just days after a rep has sold five cases to a retailer down the street. That retailer sees the new price and gets mad at the rep. That's how it goes. That's not creating a sustainable relationship with your reps or their accounts. And this isn't just for pricing; it's for volume, too, which leads me to…

7 *DON'T* SURPRISE YOUR WHOLESALERS WITH UNEXPECTED SALES INCREASES.

We, in the wine industry, have the benefit of knowing (more or less) how much of our product we'll have to sell in the next 18 or 26 months. So, let your wholesalers know what's coming down the pike. Don't tell them in January that you need them to suck up any wine you've made in whatever quantity you've made it in.

"Goaling" your distributors needs to be a discussion, not a dictation. If you don't get some form of buy-in at the beginning, and you don't allow them ample time to plan, don't be surprised if they don't hit their number. You know what happens when they don't do that, which is why I say…

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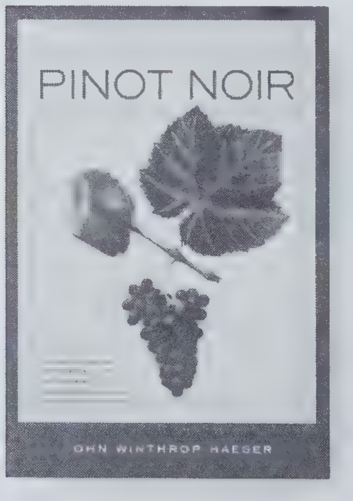

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8 **DON'T** MAKE BUSINESS REVIEWS INTO "BEAT UP THE WHOLESALER FOR WHAT THEY DIDN'T DO LAST YEAR" MEETINGS.

Discuss what worked, what didn't work, what things look like next year and the years after. The focus of these meetings should be planning for the future, beyond simply telling them what their goals are going to be for the next year. Starting with "Why didn't you meet your numbers?" will simply put them on the defensive. You can't change the past, so focus on what you can do together to achieve the results you need from that distributor in the future.

In addition, this should not be the only time over the course of the year that the distributor hears that you're unhappy. Let's go back to *Do* No. 4: communication. Keep the information flowing all year long — don't keep it inside for 12 months and then bring it up in January.

9 **DON'T** FORGET TO ASK YOUR WHOLESALERS HOW YOU CAN HELP THEM BE MORE SUCCESSFUL WITH YOUR BRAND.

With apologies to John F. Kennedy, "Ask not what your distributors can do for you, ask what you can do for your distributors." Instead of calling with a problem, call to ask them what you can do to help. Survey them. I've done some projects for wineries in which I confidentially interviewed their wholesalers to find out what the winery was doing right and wrong. I've heard some amazing feedback that I've been able to take back to wineries to really help them learn why things aren't going their way in the marketplace.

Instead of asking "What are you doing wrong, Mr Wholesaler?" ask them, "How can I help you do right?"

10 **DON'T** VIEW YOUR WHOLESALER RELATIONSHIPS AS ADVERSARIAL.

"Don't treat them, talk about them, or promote them as adversarial — unless that is really what you want." That's a direct quote from a major distributor in California, and he couldn't be more spot-on. I'm a firm believer that you get more flies with honey than with vinegar, and that old adage certainly applies to the winery/wholesaler relationship.

Many California wineries got spoiled during the boom times, and it's possible that we need a bit of an attitude adjustment when dealing with wholesalers, who are critical parts of our supply chain. Let's not forget that every new winery, every new varietal offering, every brand line extension, and every special bottling requires additional effort by our wholesale partners.

The number of wines and brands has skyrocketed. It stands to reason that wholesalers no longer have time to build our brands on their own — wineries need to take ownership of that process, start to finish. Wholesalers are a means to that end, but not the end unto itself.

You may think that I'm some kind of wholesaler apologist, but let me assure you that I could draft a long list of do's and don'ts for wholesalers, too. But at the end of the day, or at the end of the fiscal year, we the wineries, the owners of our brands, are the ones responsible for our own success. ■

As a wine sales / marketing consultant with NewLevel Group in Napa, CA, Michelle Rowell uses her decade of experience in all tiers of the three-tier system to help wineries improve relationships with wholesalers and sell more wine. Michelle may be reached at 707/255-5555 x 104 or mrowell@newlevelgroup.com.

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ANAPHYLACTIC SHOCK

Bee sting allergies in the vineyard

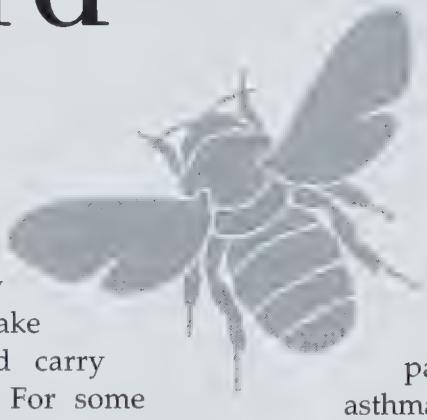
BY Wells Shoemaker, MD
Salamandre Wine Cellars, Aptos, CA

We bless our honey bees in the spring. Without their busy ministrations, we would have little fruit to ferment. It would also be unusual to harvest grapes without a swarm of bees around the crusher. We try to peacefully coexist with them, but they tend to react angrily when we grab them.

Yellow jacket wasps are more aggressive than honey bees. They build hidden underground nests, and they may attack an unsuspecting vineyard worker with no apparent provocation. There may also be hidden wasp and hornet nests in the vine canopy.

We've all been stung, but for a small number of highly allergic individuals, bee stings can provoke more than the customary expletives. Tiny amounts of bee venom can trigger a catastrophic anaphylactic reaction, including shock and obstruction of breathing passages in as little as 10 minutes. This short interval may not allow time to reach an emergency room from many remote vineyards and wineries.

Bee sting allergy kills more Americans every year than sharks, bears, and rattlesnakes, but unlike encounters with the toothy predators, bee sting fatalities can nearly all be averted if you are prepared.



Most people with severe bee sting allergy know about it, take precautions, and carry emergency kits. For some people, however, the first severe reaction may be their last surprise. Visitors to the winery are an unknown liability, but we can be prepared to be our brother's keeper for about $100.

Keep an emergency kit, containing a quick-fire adrenalin (epinephrine) shot and an antihistamine tablet near the crush stand, another one in an obvious location in the vineyard, or perhaps in the glove compartment of your truck.

Two of the common brand names are Epi-Pen and Ana-Kit. They require a prescription, but they are designed to be used by laypeople under stress. I'd suggest you invite your local physician for a special tour and then have the physician give you instructions in how and when to administer the shot. The physician may have more complete advice, but what follows is the short version.

How do you recognize the danger signs of a serious allergic reaction?

The onset of symptoms of severe allergy is rapid, typically within minutes. Victims usually know immediately that something is wrong. They turn pale, sweat profusely, and have a sense of grave foreboding — believe it! Sit them down and call for help. They may pop out with hives far away from the sting location — that's a serious warning. Phone 911 for help if you can. Better find that kit.

If a victim feels lightheaded, dizzy, nauseated, or acts "out of it," it's a sign his blood pressure is dropping. This heralds impending anaphylactic shock, and it gets worse. They should lie down and elevate the legs. Give the shot.

If the victim's voice changes pitch or goes hoarse, or if he starts making raspy, squeaky breathing noises, you have immediate peril of losing air passage. If someone has an asthma inhaler, use that, too. Give the shot.

Don't wait. You will not do harm with that shot, and it may save a life. Get the person to an emergency room and do NOT be lulled into complacency if the shot works and the person feels better on the way. Ride in an ambulance if that is practical. If not, take the victim in a car, but do not add new trauma to your day! Call 911 so somebody knows you are coming. The victim needs strong follow-up medicine. Do not let the victim talk you out of going to the hospital.

Many forward-thinking companies provide CPR training for their staff, but when a victim's airway is swollen shut, even robust artificial breathing may not move much air. You need that shot and professional help as soon as possible.

There are two bee sting reactions that are common and memorable but not dangerous.

1. All stings hurt immediately, and they will always create a swollen red lump around the puncture. Look carefully for the stinger, and scrape it sideways if it is still stuck in the skin. Apply ice. After a few days, the local pain gives way to itching, which may go on for a week or more. This is just a nuisance — a normal reaction to the

poison. Nothing needs to be done beyond insulting the genus *Hymenoptera*.

2. A fair number of people sport a colorful reaction called "delayed local hypersensitivity." This causes redness and swelling which progresses over several days to involve adjacent areas of the body. The skin will be warm or hot to touch and quite red. This looks like infection but it is not, and will begin to subside within a week.

For example, a sting on the finger may lead to a swollen wrist the next day and a swollen forearm all the way up to the elbow the next. As dramatic as these "Popeye" forearms may be, they are not dangerous. Also, they are not a sign that the next sting will lead to one of the dangerous reactions described earlier.

The keys are that the swelling is contiguous to the sting, it develops hours or days after the sting, and Popeye otherwise feels fine. If the victim is wearing a ring on a finger that may become swollen, especially if the sting is on a ring finger, remove the ring immediately as the ring may be impossible to remove several hours later.

Medicines like antihistamines, cortisone, and creams do not work very well for delayed local hypersensitivity, but we usually use them anyway. Of course, if you have this kind of reaction and chug a soda pop with a yellow-jacket in the can, you are going to need a doctor to give you some help, but you probably have time. Perhaps you should begin driving toward a hospital.

Finally, what should a winery worker with a history of an immediate, dangerous reaction do after the crisis? See your doctor!

Allergy shots for bee stings work pretty well, but you can't count entirely on that approach. Susceptible people must carry their own lifesaving kits and teach their family and coworkers how to use them. Highly allergic individuals should strongly consider working away from bee exposure. ■

Dr. Shoemaker is a pediatrician, winemaker for 20 years, and past contributor to **PWV** *on Wine & Health. He wrote this article after a "real life" anaphylactic event in Harvest 2004.*

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SUPPLIER GRAPEVINE

Model 4200 "Wee" Badger introduced

Weed Badger has introduced the Model 4200 "Wee" Badger for in-row tillage and mowing in vineyards, designed for small tractors and crawlers in the 18 to 30 hp range. The 4200 is designed for working in high-density vineyards with tractor rows as narrow as 47 inches.

The 4200 has a 3-point mount with wrap-around design for up-front visibility. Features include a "no-chatter" hydraulic pump and on-the-go tilt. Optional attachments include an in-row tool carrier.

The base system components of the 4200 have been field-tested in the U.S., Canada, Australia, South Africa, and South America. The series ranges in price from approximately $4,500 to $5,500 when purchased direct from the Weed Badger factory.

For more information and a free video, call 800/ 437-3392, fax 701/ 778-7501; website: www.weedbadger.com or email: weedbadg@drtel.net. ■

CALENDAR

New Zealand 2006
Cool Climate Symposium Viticulture & Enology
Lincoln University
Christchurch, New Zealand

PRELIMINARY AGENDA

MONDAY, FEBRUARY 6

Opportunities / challenges of cool climate winegrowing in New Zealand, *Michael CT Trought / Laura Nicolau, Science Leader / Lecturer in Wine Science, NZ*

Winegrowing 1 – Running hot and cold: grapegrowing / winemaking in contrasting climates, *Brian Croser, Lion Nathan Wine Group, Australia*

Winegrowing 2 – Grape to wine flavor management for cool climate wine styles, *Denis Dubourdieu, Denis Dubourdieu Domaines, France*

Wine Business 1 – The market niche for cool climate wines, *Robert Nicholson, International Wine Assoc.*

Cool Climate – Understanding managing impacts of seasonal variation in cool climates

Winegrowing 1 – Clones and cultivars for cool climates

Winegrowing 2a – Deconstructing aromas of cool climate Sauvignon Blanc

Winegrowing 2b – Chemical and microbial wine flavor defects. Identification, prevention, and recovery

Regional wine tasting

TUESDAY, FEBRUARY 7

Winegrowing 3 – Management options for cool climate vineyards: present and future perspectives, *Richard Smart*

Wine Business 2 – Making your mark in the market, *Paul Dolan, Mendocino Wine Group*

Winegrowing 4 – Getting the sparkle into grapes: Growing for sparkling wine, *Michael Mackenzie, Champagne Jacquesson, France*

Winegrowing 5 – Bubble in the bottle: sparkling wine styles

Winegrowing 3 – Selecting cool climate sites: more important than choosing your spouse!

Winegrowing 4 – International experiences in sparkling wine grape production

Winegrowing 5 – Factors affecting autolysis in sparkling wine

WEDNESDAY, FEBRUARY 8

Winegrowing 6 – Tools of the trade: developing / incorporating mechanization into intensely-managed cool climate vineyards, *Justin Morris, Institute of Food Science & Engineering, Univ. of Arkansas*

Winegrowing 7 – Ice wine: the frozen truth, *Gary Pickering, Cool Climate Oenology & Viticulture Institute, Brock Univ., Canada*

Wine Business 3 – Crafting terroir: people in cool climates, soils, and markets, *Warren Moran, Univ. of Auckland, New Zealand*

Wine Business 4 – What makes cool climate wines cool? A wine writer's perspective, *Ch'ng Poh Tiong (The Wine Review), Singapore*

THURSDAY, FEBRUARY 9

Winegrowing 8 – Future considerations for disease control, *Doug Gubler, UC Davis*

Winegrowing 9 – Integrated production systems, *Andries Tromp, ARC Infruitec-Nietvoorbij, South Africa*

Winegrowing 10 – Green compounds from grapes, *Malcolm Allen, Charles Sturt Univ., Australia*

Winegrowing 11 – Right tools for the job: dealing with cool climate wine styles, *David Wollan, Wine Network, Australia*

Winegrowing 6 – Taking mechanization research into the vineyard/wine

Winegrowing 7 – Ice wine production

Winegrowing 8 – Grapevine trunk diseases

Winegrowing 9 – Problems and pitfalls of cool climate integrated production systems

Winegrowing 10 – Perceptions of green characters by wine consumers

Regional wine tasting

FRIDAY, FEBRUARY 10

Wine Business 5 – Will consumers learn to like cool climate wines, or will have to teach them? *Larry Lockshin/Anthony Spawton, Univ. of South Australia*

Winegrowing 12 – Managing weather-related grapevine damage, *G Stanley Howell, Michigan State Univ.*

Winegrowing 13 – Leading by a nose: Commercial realities and sensory analysis of wine, *Isabelle Lesschaeve, Cool Climate Oenology & Viticulture Institute, Brock University, Canada*

Wine Business 5 – Terror or Terroir: how to teach consumers to love cool climate wines

Winegrowing 11 – Micro-oxygenation for influencing wine character

Winegrowing 12 – Keeping out of the cold: frost damage, prevention, and recovery

Winegrowing 13 – Incorporation of sensory data into business plans

Symposium dinner/extravaganza!

SATURDAY, FEBRUARY 11

Post-symposium tours

For more information, visit
the website at: iccs2006.org.NZ

PACKAGING SHOWCASE

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ALTERNATIVE CLOSURES
CAPSULES • CORKS • EQUIPMENT
BOTTLES • LABEL PRINTING
PACKAGING DESIGN • SHIPPERS

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SAVERGLASS

Saverglass leads the market with new creations in the wine industry. Many bottles are being used in unique ways to work with an ever-evolving breed of marketers wanting to appeal to an inquisitive and fickle consumer. The lines drawn between extreme and original are blurred and, for this reason, Saverglass has created new Icaro, Kendo Wine, and Aleka 750ml custom bottle molds. There is no limit to the innovative ideas that evolve into the bottles of tomorrow.

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SaVer glass

Call for a showroom appointment and review the 2005 Portfolio #4 highlighting top Saverglass products over the past year. Saverglass is ISO 14001-certified and meets the highest standards of quality in the industry.

For more information, contact:
Saverglass
Erica Harrop, vice president, sales & marketing; **Jennifer Larmie**, packaging representative; **Sylvie Langlois**, packaging representative; **Carol Tracy**, sales support.
860 Napa Valley Corp. Way, Ste S
Napa CA 94558
tel: 707/259-2930; fax: 707/259-2933
website: www.saverglass.com

PLEASE SEE SAVERGLASS AD, PAGE 64.

COLLOPACK SOLUTIONS

ColloPack Solutions provides premier lines of packaging and processing equipment and supplies to the U.S. wine industry. ColloPack's comprehensive range of packaging products includes sparkling and still wine corks from Francisco Oller, polylaminate and PVC still and sparkling wine capsules from Enoplastic and C & E Capsules.

COLLOPACK
SOLUTIONS LLC

ColloPack offers a complete line of equipment to apply these products including Bertolaso still and sparkling wine corkers, and Robino and Galandrino capsule dispensers, spinners, and wirehood application machines.

For more information, contact:
ColloPack Solutions
Dave Means, Phil Giacalone, Rick White, Joe Mironicki, Mike Wlodaczyk, or Greg Fulford
193 Camino Dorado, Napa, CA 94558
tel: 707/258-3940; fax: 707/258-3949
e-mail: sales@collopack.com

PLEASE SEE COLLOPACK AD, PAGE 89.

ENCORE!

ENCORE! has grown to fulfill glass and packaging needs of over 600 wineries in the western U.S since 1975. ENCORE! gives each customer the individual attention they deserve.

ENCORE! distributes more than 70 wine bottles in nine different colors with various cork-finishes in 187ml to 27 liter. ENCORE! carries a wide selection of European styles for special products. Label removal, bottle washing, sterilization, decanting, and repacking are available.

New ENCORE! products are: 10 different 750ml bottle shapes in nine colors with 30mm x 60mm screwcap finish; and Alcoa aluminum 30mm diameter x 60mm long skirt screwcaps in eleven stock colors.

Inquiries are invited regarding the Alcoa Vintegra bottles and closure system.

With over 35 years of experience, ENCORE! is an innovator in wine packaging suiting all needs: bottles, ceramic decorating, litho cartons, specialty bottles, or just regular bottling needs. ENCORE! is very interested in what you want!

ENCORE!

ENCORE! supplies molded-fibre wine shippers in two- and 3-pack formats with matching cartons that meet Wine Institute/CAWG purchasing guidelines for sustainable packaging. Two-pack trays are available in two-, four-, six-, and 12-pack shippers; three-pack trays in three-, six-, and 12-pack shippers.

For more information, contact:
ENCORE!
860 S. 19th St., Richmond, CA 94804
tel: 510/234-5670; fax: 510/234-0433

PLEASE SEE ENCORE! AD, PAGE 36.

Scott Laboratories, Inc.

Scott Laboratories offers roll-on, tamper-evident (ROTE) Alplast Chisure SpA aluminum capsules. Alplast (near Asti, Italy), was founded in 1954 and now produces more than 4.5 billion closures annually. Capsules are available in the long skirted 30x60mm size and other sizes.

Alpast capsules are produced on the newest machinery and printed using both lithographic and offset technologies (according to need). Artwork possibilities are among the broadest in the industry. Liner choices include EPE, Saranex, aluminum, or tin. In addition to the capsules themselves, Scott offers MBF machinery to apply ROTE aluminum capsules to bottles.

In natural corks, Scott is founding and continuing member of the Cork Quality Council continuing to work to control and eliminate TCA. In December, 1999, Scott began screening all cork bales for TCA using SPME machinery at ETS Laboratories (Napa, CA). Beginning in fall 2001, this screening was supplemented by another SPME machine in Portugal to test corks before shipment from Europe. Ongoing improvement has been achieved. All lots are kept separate prior to testing to optimize usefulness of the system.

For champagne corks and wirehoods, Scott continues its long-term relationships with Relvas Corticas and ICAS SpA. Relvas Corticas has long been known for its innovative policies. All wood is purchased directly from the forest. Unique among champagne cork suppliers, all materials (including all granulate and discs) are sourced and processed in-house. ICAS is the world's largest and most advanced producer of wirehoods. It is the leading supplier in Europe, North America, and Australia.

For more information, contact:
Scott Laboratories, Inc.
PO Box 4559, Petaluma, CA 94955
tel: 707/765-6666; fax: 707/765-6674
e-mail: info@scottlab.com; website:
www.scottlab.com

PLEASE SEE SCOTT LABORATORIES ADS, PAGES 22, 87, 93.

WS Packaging Group

WS Packaging Group (San Luis Obispo, CA) is a printing industry leader with a reputation for quality and service second to none. Founded in 1949 as Blake Printery, the company has grown to become one of the largest and most respected businesses on the central California coast.

WS Packaging Group, Inc.
Leaders in Printing and Packaging Worldwide

WS Packaging Group, Inc. headquartered in Algoma, WI, acquired Blake Printery in 2002. Prior to this acquisition, WS Packaging was involved in a joint venture with Blake, creating CALabel, a flexographic division operating within the Blake Printery facility.

In addition to wine label production, the San Luis Obispo location provides WS Packaging Group a west coast presence, additional capacity, and a high-end production facility.

WS Packaging specializes in the production of ultra-high-end wine labels, meeting discriminating winery demands with exact color-matching, tight registration, metallic foil application, sculptured embossing, intricate die-cutting, hexachrome color process, and just-in-time delivery.

WS Packaging is one of the few label printers offering both pressure-sensitive and sheetfed glue-applied labels from the same facility, utilizing flexographic, offset, and web-offset production.

WS Packaging continually earns national label awards for quality from the Tag and Label Manufacturers Institute and the Flexographic Technical Association.

For more information, contact:
WS Packaging Group
Ryan Mahoney, Sales Representative
2222 Beebee St., San Luis Obispo, CA 93401
toll free: 800/234-3320; fax: 805/543-2982
e-mail: marketing@wspackaging.com
website: www.wspackaging.com

PLEASE SEE WS PACKAGING AD, PAGE 32.

M.A. Silva Corks USA

M.A. Silva Corks, USA works relentlessly to build a reputation as a cork industry leader in terms of quality and customer satisfaction.

In conjunction with recent initiatives to protect customers, M.A. Silva Group is implementing HACCP procedures in all M.A. Silva companies, from cork preparation (innovation-boiling process) through customer delivery. A HACCP program illustrates the processes and procedures that a manufacturer or supplier follows from material receipt, product manufacturing, finished good storage, and ultimate delivery. All of this is done to protect the chemical, physical, and biological integrity of M.A. Silva products.

In October 2004, M.A. Silva joined the Cork Quality Council (CQC). Neil Foster, co-owner of M.A. Silva in Santa Rosa, CA, understands how vital it is to address winery concerns and quality control requirements. When the company started supplying U.S. wineries in 2001, it focused on establishing quality control procedures to guarantee customers high-quality corks. Joining the CQC seemed a natural progression for M.A. Silva in establishing itself as a leading cork supplier.

CORK PROCESSING
ALL CORK PRODUCTS

M.A. Silva's mission is to provide the finest natural corks to the premium wine industry in North America, demonstrating impeccable integrity and consistent personal service. "Always."

For more information, contact:
M.A. Silva Corks USA
975 Corporate Center Parkway, #125
Santa Rosa, CA 95407
tel: 707/636-2530; fax: 707/636-2531
e-mail: info@masilva.com
website: www.masilva.com

RICHARDS PACKAGING, INC.

On the west coast of North America, Richards Packaging maintains a distribution system supplying wine bottles, metal closures, and other accessory packaging to both large and small wineries of this region. Richards Packaging has 18 sales offices and distribution centers across the U.S. and Canada, with west coast sales offices in Sacramento, Los Angeles, Portland, Seattle (Kent), and Vancouver. Richards Packaging stocks all of the major bottles and many specialty wine bottles.

Richards Packaging is especially proud of a long-term relationship with United Closures, a world-class manufacturer of Roll-On Tamper-Evident (ROTE) aluminum closures. United Closures offers a full range of wine closure sizes, with top and side decoration. Their quality and delivery records are unsurpassed, and they provide technical support you need for quality packaging. One California customer, Pacific Wine Partners, shares their experience with ROTE closures (see page 33).

Richards Packaging also supplies related winery packaging including synthetic and natural corks, bar-top closures, PET wine bottles, and both tin and polylam capsules.

To contact the nearest sales office, please refer to Richards Packaging website, www.richardspackaging.com, which lists all locations.

For more information on ROTE closures, contact:

Richards Packaging
Robert Boord, UCP Program Manager
4721 Burbank Road, Suite 1
Memphis, TN 38118
tel: 901/360-1121
e-mail: bboord@richardspackaging.com
website: www.richardspackaging.com

VBS INTERNATIONAL, INC.

VBS International, Inc., a leader in liquid nitrogen delivery systems for oxygen displacement, can help wineries reduce headspace oxygen and extend shelf-life in scewcap packages while preserving taste.

VBS
INTERNATIONAL INC.

As wineries transition to screwcaps, VBS enables winemakers to consistently produce the highest quality wines. Although screwcaps eliminate the concern of "cork-taint," screwcaps can present new, unique challenges. The physical design of the screwcap results in a greater headspace volume which, in turn, can result in increased oxygen pick-up. Winemakers have long battled oxidation. Oxygen is typically introduced through the atmospheric oxygen trapped inside headspace. So, it's not suprising that screwcaps have raised concerns. However, there is a solution.

By introducing liquid nitrogen into the bottle after filling, winemakers reduce O_2 content by more than 70%. In fact, the headspace will now have less O_2 than the ambient atmosphere. Although this technology isn't new — VBS has been working with California wineries for over 15 years — it's become critical for new screwcap bottling lines.

After installing a VBS injection system, one winery reports dissolved oxygen content of less than 0.03 without compromising the fresh fruit taste of the wine.

For more information, contact:

VBS International, Inc.
745-B Camden Ave., Campbell, CA 95008
tel: 408/371-3303; fax: 408/371-3320
e-mail: salesinquiry@vbsflex.com
website: www.vbsinternational.com

AMORIM CORK AMERICA

Amorim Cork America is the U.S. subsidiary of Amorim and Irmãos of Portugal, the world's largest manufacturer of natural cork closures. Amorim Cork America provides sales, service, and custom finishing services to wineries throughout the U.S.

In 2003, Amorim introduced ROSA, a breakthrough steam distillation system that dramatically reduces the level of TCA in cork. ROSA's results have been confirmed by independent trials from the world's leading research laboratories.

AMORIM CORK AMERICA

Amorim Cork America offers a full line of natural cork products: **Natural straight cork** in standard 24mm diameter in 38mm, 45mm, 49mm, 51mm, and 54mm lengths available in two washes: BWC or Natural.

Spark® cork, designed for sparkling wine and utilizing INOS II-washed disks to eliminate off-aromas.

Twin Top® cork, a closure with an agglomerated mid-body with a ROSA-treated disk at each end, widely accepted for its consistency of size, performance, and sensory neutrality.

Colmated cork, a high-quality, low-cost alternative for wines meant for early consumption.

Neutrocork®, a micro-agglomerated closure made of ROSA-treated particles that make it price-competitive while maintaining excellent sensory values.

Amorim Cork America is a member of the Cork Quality Council. All corks are subject to GC/MS testing for TCA at ETS Laboratories prior to acceptance into inventory.

For more information, contact:

Amorim Cork America
2557 Napa Valley Corporate Dr., Ste. A
Napa, CA 94558
tel: 707/224/6000; fax: 707/224/7616
e-mail: info@amorimcorkamerica.com
website: www.amorimcork.com

PLEASE SEE AMORIM CORK AMERICA AD, PAGE 21.

NOMACORC – USA/INTERNATIONAL

Nomacorc introduces a new family of synthetic wine closures: **light, smart, classic**, and **premium** — each designed to meet the needs of winemakers and their wines.

nomacorc® light — For value-priced market segment and light-styled, popular wines; available fourth quarter 2005,

nomacorc® smart — For all wine varietals in the popular-priced market,

nomacorc® classic — Protecting many premium international brands – the industry standard for synthetic wine closure performance,

nomacorc® premium — Nomacorc's most advanced product to date. Ideal for winemakers seeking longer term cellaring. Available third quarter 2006.

"Nomacorc is experiencing phenomenal growth," says James Herwatt, CEO of Cork Supply/Newpak, USA. "In 2004, Nomacorc surpassed its goal of selling 850 million wine closures worldwide. In 2005, Nomacorc projects sales of more than one billion."

nomacorc®
"Simply a Better Closure."

Nomacorc, Inc. is certified ISO/9001. All ***nomacorcs*** comply with British Retail Consortium and Institute of Packaging "Global Standards for Packaging." Consistent yearly growth, proven quality, strong business alliances, and best technology practices combine to offer Nomacorc customers "simply a better closure."

For more information, contact:
Nomacorc
505 NMC Drive, Zebulon, NC 27597
tel: 919/269-4728
e-mail: info@nomacorc.com
website: www.nomacorc.com

PLEASE SEE NOMACORC AD, PAGE 8.

CASTORO BOTTLING COMPANY

Since 1989, Castoro Bottling has served wineries throughout California with a fleet of high-tech mobile bottling lines. The demand for Castoro Bottling's timely, professional, and knowledgeable service has triggered the bottling of over 48 million bottles of wine with natural cork, synthetic corks, and screwcaps.

Castoro Bottling offers three technologically-advanced mobile bottling lines that arrive on your schedule to serve all your bottling needs. Castoro Bottling can bottle up to 2,500 cases per day, serving any size winery. A number of custom services are offered, including labeling and packaging consultation. Recognizing the need for wineries to offer alternative closures, Castoro Bottling has outfitted two of the bottling lines with **screwcap** capabilities.

CASTORO BOTTLING CO.
CBC
FILLING YOUR NEEDS

"Our investment in the best equipment and the best people to run that equipment is what sets Castoro Bottling apart," says Niels Udsen. "We anticipate the needs of a winery better than any other bottler simply because I have owned and operated a successful winery for over 20 years. Castoro Bottling is a partner who knows and understands your business."

New for 2005, Castoro Bottling Company is now offering **Velvorin dosing**. Please call today, or visit www.castorobottling.com for more information:

Castoro Bottling Co.
Niels Udsen
PO Box 954, Templeton, CA 93465
tel: 805/467-2002; fax: 805/467-2004
e-mail: Niels@castorobottling.com
website: www.castorobottling.com

PLEASE SEE CASTORO BOTTLING CO. AD, PAGE 52.

G-3 ENTERPRISES

A little over two years ago, four companies that served wineries individually for decades joined forces to become G-3 Enterprises. This combination of skilled people and technologies has become a natural lineup of related operations. G-3 Enterprises has four divisions to serve as a single-source solution for wineries: labels, closures, bottle decorating, and logistics, with headquarters in Modesto, CA.

QUALITY · VALUE · SERVICE ·
G3
· ENTERPRISES ·

The label division supplies sheet fed, glue-applied labels or pressure-sensitive labels and pre-press services. It also provides value-added hot stamping, embossing, and die cutting on labels. The printing plant now serves short-run demands in addition to long-run needs by using a narrow web pressure-sensitive flexography press.

The closure division manufactures roll-on pilfer-evident aluminum caps, corks, capsules, liners, and other closure materials. They also produce the only domestically manufactured 30mm x 60mm long flange Royal 90™ screw cap.

The bottle decorating division offers two distinct bottle decorating technologies: heat transfer labeling for permanently affixed labels, and bottle etching.

The logistics division provides freight, warehousing, and other logistical support for case goods, bulk materials, bulk liquid transport, and grape hauling.

For more information, contact:
G-3 Enterprises
Kyle Rossler,
vice president of sales/marketing
tel: 209/341-7770
e-mail: kyle.rossler@g-3enterprises.com

PLEASE SEE G-3 ENTERPRISES AD, PAGE 30.

OENEO CLOSURES USA

Oeneo Closures (formerly Sabaté), founded in 1939, today ranks as the world's second largest supplier of cork-based wine closures and is engaged in all major wine-producing countries.

In addition to natural corks, composite and technical corks, sparkling wine corks, and cork-based stoppers for liquor and spirits, Oeneo Closures is now pursuing a full line of wine closure solutions. Oeneo Closures recently launched the DIAM cork, the only cork-based closure with undetectable levels of releasable TCA, and a new line of S-CAP screw-caps.

oeneo
CLOSURES USA

DIAM

In a world of new and exciting creative wine product packaging, Oeneo Closures believes *there is no one perfect closure for every wine,* and the company strives to assist winemakers in selecting the right closure for wines from an assortment of options.

Oeneo Closures USA was founded in 1995 and is celebrating 10 years of service to the U.S. wine industry. The company's U.S. production facility is located in Napa, CA.

For more information, contact:
Oeneo Closures USA
902 Enterprise Way, Ste M., Napa, CA 94558
tel: 707/256-2830; fax: 707/256-2831
e-mail: info@oeneoclosuresusa.com
website: www.oeneoclosuresusa.com

METROPOLIS LABEL CORP.

Metropolis Label Corp., formerly known as Jonergin Pacific, has undergone a change in ownership. The new owner, Metro Label Group Inc., started in 1974, from a very humble beginning – one man and his dream. Today, it is still a family-run business but ranks as one of the largest pressure-sensitive label converting companies in North America with additional plants in Toronto, Vancouver, and Montreal.

Metropolis
LABEL

Metropolis Label firmly believes that an excellent team, state of the art equipment, effective communication, quality customer service, and the commitment to excel are the key ingredients for manufacturing quality products.

Metropolis Label offers labels using various substrates, complex label shapes, multiple foil stampings, sculptured embossing, screen printing, and aqueous/UV coatings — in one press pass. Metropolis Label produces eye-catching, fine wine labels that communicate to consumers everything your product has to offer.

Specializing in developing pressure-sensitive labels for exclusive brand names, Metropolis Label works to meet individual needs. Metropolis Label believes in building long-term relationships resulting in the mutual appreciation of everyone involved, while understanding the benefits of customized label programs that greatly contribute to the clients' profitability and success.

For more information, contact:
Metropolis Label Corp.
1901 North Kelly Rd., Napa, CA 94558
tel: 707 / 226-2806; fax: 707 / 226-2894
e-mail: bjones@metropolislabel.com

PLEASE SEE METROPOLIS LABEL AD, PAGE 41.

WINE COUNTRY CASES, INC.

Wine Country Cases (WCC), is a manufacturer of custom wood packaging for the wine and food industries. Founded in 1988, WCC services include design and manufacture of all types of wooden wine packaging including:

- Traditional six- and 12-bottle boxes,
- Gift boxes,
- Display boxes,

To complement the packaging produced, the following processes are available for further enhancement of the package:

- Hot branding — a process that, by heat and pressure, brands logos and artwork into wood components,
- Foil stamping — introduces colored foil into the image, while utilizing the same process as branding,
- Silk screen printing — a process that allows multiple colors to be reproduced.

WCC also produces custom manufactured foam shipping assemblies for all wood boxes, allowing package shipment without further handling of the product.

Small minimum quantities and short lead times make wood packaging a cost-effective alternative for most marketing and sales objectives.

For more information, contact:
Wine Country Cases, Inc.
995 Vintage Ave., St. Helena, CA 94574
tel: 707/967-4805; fax: 707/967-4807
e-mail: boxmaker@napanet.net

PLEASE SEE WINE COUNTRY CASES AD, PAGE 43.

RIVERCAP USA

RIVERCAP, a family-owned company based in Spain, specializes in production of premium quality tin capsules for the wine and spirits industries. **RIVERCAP** was founded in 1990 by Enrique Echepare, a mechanical engineer by training with 20 years experience producing one-piece punched capsules, originally tin-lead and, subsequently, pure tin.

RIVERCAP was the first capsule manufacturer to exclusively produce tin capsules. All punching, painting, and decorating machines are designed and built in-house. Each machine incorporates innovative improvements to increase decorating capabilities to meet increasing demands of marketing and design departments.

Registered silkscreen colors on the side, and either embossed or silkscreened top decorations, are all standard features. Material thickness can range from 80 microns for the standard bottleneck finish, to 140 microns for new fat-neck bottles.

Sizes range from the 27.00 mm to 33.25 mm diameter for standard 750 ml bottles and larger sizes are available for 3, 5, and 6-liter bottles.

A DIVISION OF NEWPAK USA

The **RIVERCAP** in-house design department can design and develop decorations to match labels, and colors are blended to match either Pantone references or a customer's particular color swatch. All paints provide superior resistance to scuffing.

"Let **RIVERCAP** put the finishing touch to your premium bottle of wine."

For more information, contact:

Rivercap USA
537-F Stone Road
Benicia, CA 94510
tel: 707/747-3630; fax: 707/746-7471
e-mail: jbell@rivercapusa.com

VITRO PACKAGING

Vitro Packaging, Inc. has been supplying the wine industry innovative wine packages for over 20 years and offers a full line of European and American wine bottles in cork and screw-on finishes. Glass color selections include dead leaf, champagne, antique, and emerald green in addition to cobalt blue and smoke.

Vitro Packaging's full service new product group offers bottle design, carton specifications, and printing graphic development.

Pre-labeling is also available with a variety of label options including heat transfer, pressure-sensitive, shrink sleeve, organic, and inorganic silkscreen decorating (ACL). Vitro Packaging offers a turn-key capability for wine bottle packaging needs.

Please visit Vitro Packaging's website at vitropackaging.com, or call Lee Whalen, at the Napa office: 707/258-9470.

For more information, contact:

Vitro Packaging, Inc.
Lee Whalen
1443 Main St., Napa, CA 94559
tel: 707/258-9470
website: www.vitropackaging.com

PLEASE SEE VITRO PACKAGING AD, PAGE 53.

LAFITTE CORK AND CAPSULE

Lafitte Cork and Capsule Inc, is a leading supplier of high-quality corks and capsules to the North American market. As part of the Lafitte worldwide group, Lafitte California is committed to continually improving the quality of both products and service to its customers. It has built a reputation on developing long-term partnership/relationships with its customers through its ability to tailor production to customer's desires.

Corks that Lafitte supplies undergo stringent and independent GCMS / SPME testing in both Portugal and California. Lafitte Portugal is 9002-certified and is currently implementing HACCP food health certification as a key component to Lafitte's philosophy of continually improving the already high standards placed on Lafitte's cork production facilities. As one of the founding members of the Cork Quality Council (CQC) in California, Lafitte conforms to a strict set of standards to ensure only the highest quality corks are available to its clients.

Capsules are produced in France at Lafitte facilities which supply PVC, polylam, or tin capsules to U.S. wineries, with unique printing reproduction, such as nine-color decorated PVC capsules.

Lafitte California has on-site inventory of both corks and stock PVC, polylam, and tin capsules, to make Lafitte one of the most reliable and competitive suppliers in the industry.

For more information, contact:

Lafitte Cork & Capsule
45 Executive Ct., Napa, CA 94558
tel: 707/258-2675; fax: 707/258-0558
e-mail: sales@lafitte-usa.com
website: www.lafitte-usa.com

PLEASE SEE LAFITTE CORK & CAPSULE AD, PAGE 55.

Cork Supply USA

For more than 20 years, Cork Supply USA has been *redefining quality* in the cork industry. It started with establishment of the first independent cork quality lab in Portugal, Global Quality Control, rejecting those lots not meeting standards.

Other firsts in redefining quality include: first U.S. company to go back to the source and start a cork factory; to establish vertical integration in every aspect of production from forest to bottle, to provide quality assurance test results with every shipment; and set SPME rejection levels at 2 ng/l for every bale of corks.

In conjunction with the Natural Cork Quality Council, Cork Supply USA has set meaningful SPME standards used by the entire industry.

CORK
SUPPLY
USA

Cork Supply USA offers a complete line of wine corks, including: natural, 1+1's colmated, champagne, and large diameter corks. With an inventory of over 50 million corks, and a product line-up from its sister company Newpak USA, Cork Supply USA can meet the demands of any winery.

Cork Supply USA's devotion to continually redefining quality assures its customers that every product is unsurpassed in quality, service, and value.

For more information, contact:
Cork Supply USA, Inc.
537-F Stone Rd., Benicia, CA 94510
tel: 707/746-0353; fax: 707/746-7471
e-mail: sales@corksupplyusa.com
website: www.corksupplyusa.com

PLEASE SEE CORK SUPPLY USA AD, PAGE 2.

Scholle Corporation

William R. Scholle invented bag-in-box (BIB) packaging over 50 years ago. The Scholle Corporation has expanded this unique form of packaging into a diverse line of films, state-of-the-art filling equipment, and BIB-dispensing capabilities to allow safe transport, storage, and consumption of wines.

Scholle®
PACKAGING

Introduced originally in Australia, boxed wine has long been accepted as the forward thinking package of choice for years. The unique properties of bag-in-box technology keep wine fresh for many weeks after opening. Because of the superior oxygen barrier properties of Scholle bags, boxed wines have been able to achieve significantly longer shelf life. Now, smaller, uniquely shaped packages of bag-in-box for premium wines are being introduced in the global market.

Scholle products are known throughout the packaging and processing industries for their quality and value. Scholle manufactures all components of the finished product, including Scholle bags with DuraShield™ film (which delivers the most effective oxygen barrier available on the market) and the premium FlexTap™ dispensing tap. The combination of films and fitments ensure that the first glass of wine tastes as good as the last.

Select Division Brands (Santa Rosa, CA) released Wine Block in May 2005 to more than a dozen nationwide grocery chains and independent retailers. The bag-in-box measures only 4.75x4.75, is 5 inches high, and holds 1.5 liters (100,000 12-box cases were produced). The weight of each 18L case is nearly equal to a 12-bottle (9L) case. The 2004 California Chardonnay (blended with barrel-fermented wine), 2002 Merlot, and 2002 Cabernet Sauvignon (partially barrel-aged), each with a different box color, retail for $9.99.

For more information, contact:
Scholle Corporation
200 E. North Ave, Northlake, IL 60164
tel: 708/562-7290, fax: 708/409-9346
website: www.scholle.com

PLEASE SEE SCHOLLE CORP. AD, PAGE 20.

Saint-Gobain Containers

As a leading glass supplier to American wineries, Saint-Gobain has a legacy of product innovation, craftsmanship, and customer attention that spans two continents and three centuries.

After more than 300 years as one of Europe's premier bottle makers, Saint-Gobain started in America in 1995 as Ball-Foster Glass, an entity formed from the union of two U.S. companies, each with more than 100 years of distinguished glass-making experience. Today, Saint-Gobain Containers continues to uphold that tradition of excellence, having been awarded more than 40 Clear Choice Awards from the Glass Packaging Institute.

SAINT-GOBAIN
CONTAINERS

Saint-Gobain Containers is proud of its partnerships with America's most accomplished vintners and the role its products have played in the growing worldwide recognition of American wines.

For more information, contact:
Saint-Gobain Containers
Marilyn La Grange
1509 S. Macedonia Ave., Muncie, IN 47307
tel: 765/741-7622
website: www.sgcontainers.com

PLEASE SEE SAINT-GOBAIN CONTAINERS AD, PAGE 49.

ALCAN PACKAGING

Pechiney and Alcan, two worldwide leaders in the aluminum and packaging industry, have merged. Pechiney Cork & Seal is now Alcan Packaging Capsules of California. No more misunderstanding that Alcan does not provide corks!

ALCAN PACKAGING

Now, more than ever, the company is committed to serving you with sharp-quality capsules: tin, polylam, and sparkling. Locally, Alcan Packaging is producing these products with an excellent lead-time of 4 to 6 weeks and is the only supplier in this competitive market to do so. The Alcan team is devoted to giving you the best service.

Alcan Packaging has added to its portfolio the new revolutionary closure: the STELVIN® and was the first on the market to produce this unique screw cap for wine. Alcan Packaging is proud of it and of our customers, who are not afraid to use it! Alcan is now offering a large variety of Stelvin® with specific liners and the result is phenomenal.

Alcan Packaging is committed to excellence in environment, health, and safety through continual improvement of awareness, understanding, and performance. Alcan Packaging's goal is to protect and promote all communities where the company operates.

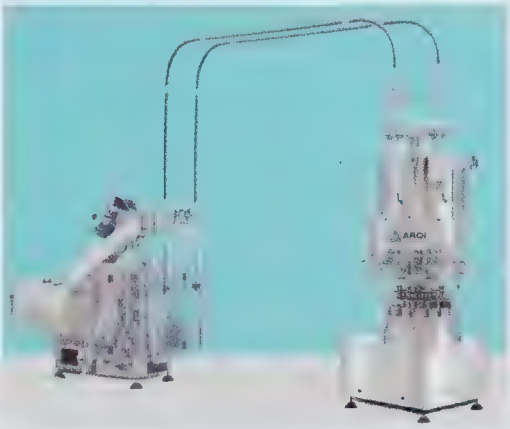
For more information, contact:
Alcan Packaging
Frederic Catteau
5425 Broadway St.
American Canyon, CA 94503
tel: 707/257-6481; fax: 707/257-8028
e-mail: frederic.catteau@alcan.com

AROL USA, INC.

The new Quasar Corker is the latest innovation in corking from AROL USA Closure Systems. The Quasar uses a floor-mounted sorter and a vacuum transfer tube to present the cork to a rotary pick-and-place device, which delivers a cork to an individual corking head. AROL's modular design allows the corker to be installed as a stand alone machine, or part of a filler/corker mono-bloc system.

Available in sizes from one to 24 heads, the Quasar Corker provides production speeds from 50 to 800 bpm. The Quasar rotary corking machine is capable of supplying flushing gas and/or vacuum in any sequence of operation the customer desires.

Why AROL's Quasar? Cork dust in the area above the open bottle is dramatically reduced with the Quasar's innovative design. The Quasar Rotary Corker utilizes a proprietary design that allows for tool-less removal of the cork compression box assembly, saving time and labor in maintaining and cleaning the machine. The use of a rotary pick-and-place device to supply one cork to one corking head is an internationally patented innovation of AROL.



For more information, contact:
AROL USA, Inc.
450 Satellite Blvd. NE, Suite D
Suwanee, GA 30024
tel: 678/318-1290; fax: 678/318-1296
e-mail: salesusa@arol.com
website: www.arol.com

PLEASE SEE AROL USA AD, PAGE 18.

RAMONDIN USA, INC.

Ramondin has been making capsules for the wine industry since 1890. Ramondin was the first tin capsule manufacturer to receive ISO 9001 certification, complying with strict standards of quality, safety, and service, and an ISO 14000 certificate, which has special emphasis on protecting the environment.

A new factory was designed and built to manufacture quality tin capsules. With recent innovations in decorating machines, Ramondin can create intricate designs for a lower cost. From traditional to cutting-edge design, the tin capsule identifies and protects your product.

Tin is an excellent replacement for environmentally-undesirable metals and plastics. Ramondin buys the purest tin and processes the silvery metal into a perfect closure. Ramondin's continued commitment to protecting the environment has led to development of water-based paints — no more solvents.

Recyclability is one of tin's great merits. Ramondin's recycling program encourages wineries to save plastic trays for reuse in new tin capsule orders. This is a huge project, but one that Ramondin feels is the right thing to do to reduce packaging waste in our landfills.

"Think green. Think Ramondin … capsules and only capsules for over 100 years."

For more information, contact:
Ramondin USA, Inc.
2557 Napa Valley Corporate Dr., Ste G
Napa, CA 94558
tel: 707/944-2277; fax: 707/257-1408
e-mail: ramondin@ramondinusa.com

PLEASE SEE RAMONDIN AD, PAGE 3.

STANPAC, INC.

Stanpac manufactures packaging products and sealing systems for the food and beverage industries. Stanpac is committed to providing customers with consistent, high-quality products and services by maintaining high standards for personnel, materials, and processes.

In today's crowded marketplace, an exciting and distinctive package can set your product apart from the rest. Maximizing the capabilities of state-of-the-art application equipment, Stanpac can decorate virtually any glass container using a direct-screen Applied Ceramic Labeling (ACL) printing process.

STANPAC

Bright, radiant colors can be matched to most capsules and labels, with excellent durability ideal for refillable containers, and able to stand up to caustic washes with complete scuff–resistance. Precious metal application adds elegance and beauty to your package.

Stanpac has been honored with several design awards, including a Gold Medal in the wine category at the 8th Annual Beverage Packaging Global Design Awards, a bronze medal for innovative ACL Label Technology at the 10th Annual Beverage Packaging Global Design Awards, and the Glass Packaging Institute Clear Choice Award for environmental packaging.

For more information, contact:
Stanpac Inc.
PO Box 584, Lewiston, NY 14092
tel: 905/957-3326; fax: 905/957-3616
email: info@stanpacnet.com
website: www.stanpacnet.com

PICKERING WINERY SUPPLY

Pickering Winery Supply distributes natural corks from Korkindustie TRIER, a century-old company located in Trier, Germany, which employs rigorous, systematic control of the entire cork production process, from selecting and washing their own corks in Germany to statistical analyses of the risk-failure one can expect from each lot.

TRIER grades its corks by physical appearance but, more significantly, corks are graded according to the likelihood of possible cork taint. By sampling 200 to 400 corks from each homogenous, washed lot of 50,000 — employing two in-house GC/MS devices and extensive statistical analysis — TRIER is able to reliably predict the likely incidence of problems with a particular lot. Acceptable corks are then classified into three categories: Standard, Plus, or Top, and priced accordingly.

"TRIER is uniquely capable of quantifying the percentage of TCA affected corks, and, the subsequent possibility of 'corked' bottles," says Kendall Pickering.

TRIER's extensive experience has convinced them that natural corks remain the best closure for fine wines, and they make every possible effort to assure that off-flavors are minimized.

KORKINDUSTRIE
1898
1998
TRIER

Wineries desiring to use the safest natural corks should contact Pickering Winery Supply for more information and samples.

For more information, contact:
Pickering Winery Supply
888 Post St., San Francisco, CA 94109
tel: 415/474-1588; fax: 415/474-1617

PLEASE SEE PICKERING WINERY SUPPLY AD, PAGE 10.

GORDON GRAPHICS

For over 25 years, Gordon Graphics has been producing some of the finest wine labels in the industry. Specializing in multi-color printing, foil stamping, embossing, and precision die-cutting, Gordon Graphics has a reputation for producing elegant labels that sell wine.

GG

Premium Printing for the Wine Industry

Client input during each stage of production guarantees the finest possible product with a minimum of surprises. More than 70 experienced employees work together with designers, marketers, and wineries to create award-winning packaging year after year.

Whether your need is for offset pressure-sensitive labels or traditional glue-on, the Gordon Graphics team will provide the expertise and service for which the company is known in both the printing and wine industries.

For more information, contact:
Gordon Graphics
15 Digital Dr., Novato, CA 94949
tel: 415/883-0455; fax: 415/883-5124
website: www.gordongraphics.com

PLEASE SEE GORDON GRAPHICS AD, PAGE 38.

DEMPTOS GLASS

Demptos Glass offers over 300 wine bottle options, from economically-priced standard shapes to ultra-premium heavyweight and specialty wine bottles.

New bottles include a full complement of Stelvin /screwcap styles: Bordeaux and Burgundy Traditional, Premiere, Etude, Symphony, Ancienne 2, Grand Millesime, and several 375 ml styles. To view one of the new bottles, call one of the sales contacts listed below to visit Demptos Glass' Napa, Fairfield, or Paso Robles, CA showrooms.

DEMPTOS GLASS COMPANY LLC

Demptos Glass stocks numerous styles and shapes in its Fairfield distribution center to help wineries avoid both long lead-times and minimum production quantities required by bottle production runs.

For more information, contact:
Demptos Glass
2300 Cordelia Rd., Fairfield, CA 94534
website: www.demptos.com
David Schwandt,
Director of Sales & Marketing
tel: 707/718-4176
Samantha White,
Sonoma, Mendocino, and Napa counties
tel: 707/718-4175
Phil Jones,
Central Coast and Sierra Foothills
tel: 805/712-8862
Jim Gleeson,
Napa and Lake counties, NW States
tel: 707/718-4174
Midwest and East Coast
tel: 502/394-9298

PLEASE SEE DEMPTOS GLASS AD, PAGE 60.

KEYES FIBRE CORPORATION

Keyes Fibre introduces the "1-2 Bottle Shipper," a unique design that will accept most bottle shapes. The Keyes shipper has passed both UPS and FEDEX shipping tests.

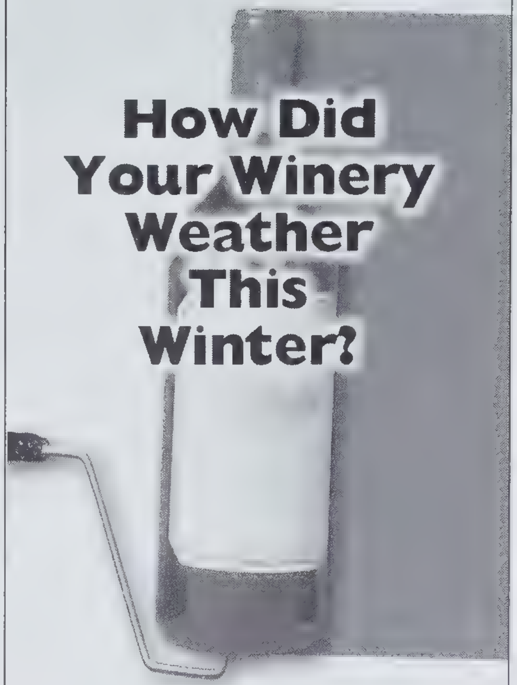
Keyes Fibre provides laydown trays for most Burgundy and Bordeaux bottles in three, four, and six-bottle configurations. Trays can be used in single and triple combinations. For example, some wineries use two, three-bottle trays for cartons of six bottles, or three, four-bottle trays for a carton of 12 bottles. Champagne style trays come in three- and four- bottle configurations, and Alsace comes in a three-bottle tray.

The molded fiber laydown trays facilitate both filling the carton and carton placement. Keyes Fibre eliminates the danger of label scuffing by properly fitting bottles in cartons.

To view Keyes Fibre's complete fibre wine packaging line, please refer to www.keyesfibre.com.

For more information, contact:
Keyes Fibre Corporation
Sue Akers
3715 Chelan Hwy., Wenatchee, WA 98801
tel: 509/663-8537 ext. 223
toll free: 800/786-8517
fax: 509/662-1023
e-mail: sakers@keyesfibre.com

PLEASE SEE KEYES FIBRE AD, PAGE 48.



Spring is here. The summer visitors and the fall crush are just down the road.

Now's the time to take a good look at one of your most important investments... your winery facility.

This last winter's rain, wind and cold temperatures took their toll on your building, making it all that much easier for the hot summer sun to do its worst. In like fashion, time takes its toll on interior surfaces: storage, processing, and your tasting room.

Paint is more than just decoration. It protects your building and preserves its value. Call us today to schedule an evaluation. We'll come out, assess the condition of your exterior and interior paint, and give you a fair and impartial recommendation.

Spurgeon Painting has been serving the North Bay since 1976 with Professionalism, Quality, Integrity and the best in Customer Service!

(707) 763-7185 Petaluma
(707) 586-1422 Santa Rosa
(707) 255-7185 Napa
(415) 459-7185 Marin

SPURGEON PAINTING Lic.#390008 INCORPORATED

1308 Dynamic Street, Suite #8
P.O. Box 2776
Petaluma, CA 94953
Fax: (707) 763-5659
www.spurgeonpainting.com

SUPREMECORQ

SupremeCorq is a market-leading quality synthetic closure since 1992. Supreme Corq is the only synthetic closure company to achieve ISO 9001:2000, BRC (British Retail Consortium), and AIB (American Institute of Baking) quality certifications.

SupremeCorqs offer a TCA-free seal to ensure consistency of wine and come in 45mm, 38mm, and T-Top (pull closure) sizes. All are recyclable and comply with FDA and EU regulations.

Available in any color, SupremeCorqs greatly enhance wine packaging. They can be printed on with a variety of different color, FDA-compliant inks that do not rub off. The company's high definition printing capability is unmatched worldwide.

SupremeCorqs are injection-molded. An outer skin completely seals the closure, facilitating removal and reinsertion while protecting internal cell structure and preventing wine absorption. SupremeCorqs will not crumble in bottles or chip on production lines.

Each SupremeCorq is quality-tested for many characteristics, including density (length, weight, diameter), coating consistency, and insertion/extraction force ensuring optimum product performance.

SupremeCorqs form an excellent seal, virtually eliminating leakage, evaporation, and musty off-flavors caused by tree-bark cork closures. SupremeCorqs are easily used on existing bottling lines and bottles can be stored upright.

More than 1,200 wineries worldwide use SupremeCorqs to preserve their wines exactly as the winemakers intended.

For more information, contact:
SupremeCorq
5901 S 226th St., Kent, WA 98032
tel: 253/395-8712; fax: 253/395-8713
e-mail: jimc@supremecorq.com
website: www.supremecorq.com

PLEASE SEE SUPREMECORQ AD, PAGE 13.

GLASS PACKAGING INSTITUTE

Glass Packaging Institute — the trade association representing the North American glass container manufacturing companies — has announced the winery winner of its biannual Clear Choice Awards. The winner in the wine-beverage category is Oliver Winery, Bloomington, IL – www.oliverwinery.com.

This glass wine bottle features an embossed bee and flower image on the shoulder, and more images of enlarged flowers and bees seen through the bottle of Camelot Mead, demonstrating:

Trends: Sophisticated ingredients for the flavor-savvy wine consumer,

Consumer Profiles: Consumers seeking alternative wine flavors,

Personalities: The images of bright sunflowers and bees convey a new wine experience — mead, a light wine made with honey.

Since 1989, the Clear Choice Awards Program has honored consumer products goods (CPG) manufacturers who expand the frontiers of glass packaging design by using glass containers in innovative ways.

For more information, contact:
Glass Packaging Institute
515 King St. Ste 420
Alexandria, VA 22314
tel: 703/684-6395
fax: 703/684-6048
e-mail: info@gpi.org
website: www.gpi.org

PLEASE SEE GPI AD, PAGE 37.

NEWPAK USA, INC.

Newpak USA, Inc., a member of the Cork Supply Group, was created to offer a wide variety of products to the wine industry backed by the Group's experience and reputation for high quality and service.

Newpak USA, through Cork Supply USA, helped to develop the Nomacorc™ synthetic wine closure, which has grown to sell over one billion closures annually.

Seeing the need for superior, premium tin capsules, Newpak USA introduced Rivercap™ tin capsules, backed by nearly 30 years of experience in production of high-quality tin capsules.

As demand in the industry grew for a better screwcap, Newpak USA introduced SAVin™ deep, drawn, pilfer proof (DDPP) screwcaps. Available in a wide variety of sizes and colors with 4-color printing.

No matter which product you choose, rest assured that Newpak USA's devotion to quality ensures it will be unsurpassed in quality, service, and value.

For more information, contact:
Newpak USA, Inc.
tel: 707/746-5704; fax: 707/746-7471
e-mail: sales@corksupplyusa.com
website: www.corksupplyusa.com

Mealybugs

Continued from page 16

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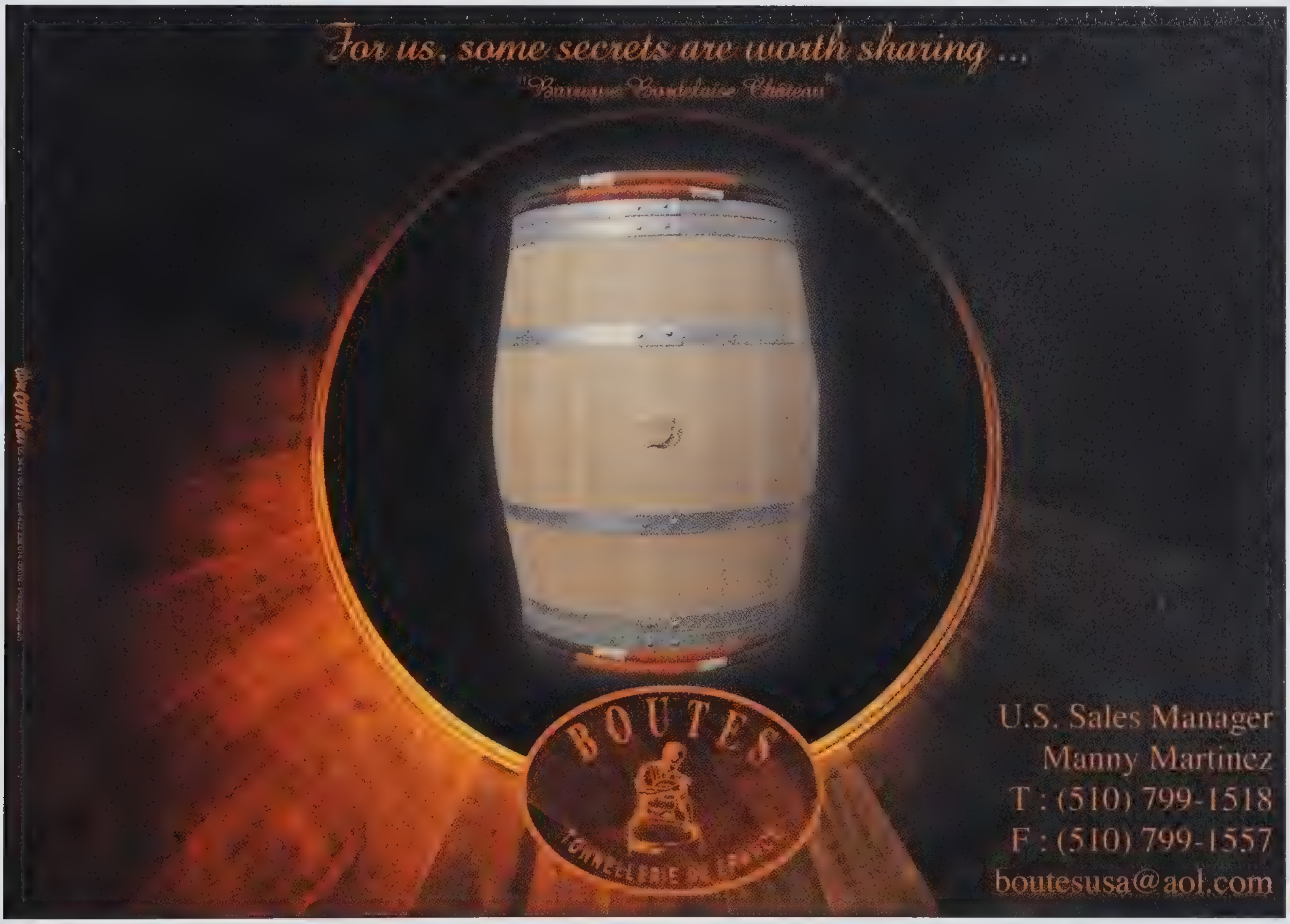
For us, some secrets are worth sharing ...
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U.S. Sales Manager
Manny Martinez
T : (510) 799-1518
F : (510) 799-1557
boutesusa@aol.com

Protect workers from heat emergencies

**BY Doug Price, Viticulturist
Clos du Bois Vineyards,
Geyserville, CA**

Finally the summer heat has descended! Good for reducing mildew pressure and for ripening the fruit, but not so good for the health and safety of personnel in the vineyards. Many workers and managers don't recognize heat as a potential cause of illness and, in the extreme cases, loss of life. A case of heat stroke from working in extreme temperatures and not consuming enough liquids can land a worker in the intensive care unit for a few days of recovery.

For all health and safety issues, prevention is best. Learn how to identify and prevent heat emergencies.

Convection and evaporation

Our bodies have very efficient methods of controlling and regulating temperature. The body can take on or get rid of heat through radiation (as by standing in the sunshine, since heat is carried by infrared radiation), convection (a cool breeze carries away heat — this effect is helped by having loose clothing), and evaporation (sweating).

During extreme heat, the body becomes less efficient at regulating normal body temperature, and will actually absorb heat energy rather than dissipate it. This is why the more experienced field worker will wear long, loose-fitting clothing that covers exposed skin, promoting heat loss through evaporation and convection. Ideally, the clothing should be light-colored to minimize absorption of heat (infrared) radiation.

Evaporation of sweat is the most effective form of heat loss. Evaporation rates for the body are influenced by several factors:

- Humidity,
- Exertion,
- Fluid Intake,
- Acclimatization.

As a muscle is used, it creates heat. The harder it is used, the more heat is created and the greater the need to dissipate the extra heat produced. The amount of exertion will determine the rate at which evaporation will occur and how much heat is discharged from the body via evaporation (sweating).

Without a sufficient reserve of liquid in the body, evaporation will not occur, and heat energy remains in the body. To be able to generate enough sweat for efficient evaporation, the body requires extra water.

If the body's water reserves are at a level of near-depletion, the body will stop sweating to preserve blood pressure and avoid shock. So, the better the hydration, the more evaporation can take place. By maintaining the proper level of hydration you will ensure efficient evaporation will occur.

Fieldwork can be strenuous. It is critical to avoid dehydration during extreme heat, and in normal weather.

Acclimatization (the way our bodies deal with severe changes in temperatures) to extreme heat requires the body to produce more sweat. Though acclimatization begins after two days, it normally requires a couple of weeks for a body to totally acclimatize, but as it does, the volume of moisture it releases via sweat increases, and the loss of sodium decreases. Various medications may inhibit the ability to sweat, and consulting with a physician prior to exposure is recommended.

Thirst cannot be used as an accurate indicator of the need for fluid intake. If you become thirsty during or after activity you are already becoming somewhat dehydrated. You need to make sure that you drink fluids even when you are not thirsty.

Types of heat illness

Heat illness is described in four stages, all of which blend into each other. These are:

1. Heat syncope,
2. Heat cramps,
3. Heat exhaustion,
4. Heat stroke.

Heat syncope is a fainting spell, which is momentary and is associated with a drop in blood pressure. It can generally be treated with rest in a cool place and fluid replenishment for at least 15 minutes, or until feeling back to normal.

Heat cramps are sudden severe muscle cramps ("charley horses") in the abdomen or legs. The cramps can be very painful and are thought to be the result of salt and mineral losses. Again, this can be treated with rest in a cool area, replenishment of fluids and electrolytes. Four teaspoons of salt per gallon of water, or sport drinks like Gatorade, are acceptable forms of replenishment. Fruit and fruit juices are also helpful because they contain potassium and other minerals.

Heat exhaustion is characterized by prolonged symptoms of weakness, headache and sometimes, mental changes (agitation or confusion). This is potentially a very serious condition and should be treated immediately with a cool environment, fluids, and examination by a physician. The physician needs to assess the internal temperature, evaluate the need for intravenous fluids, and provide appropriate treatment.

Heat stroke is a *very* serious occurrence and has an almost 50% mortality rate. This is the end-stage of heat exhaustion and symptoms include a loss of consciousness.

Heat stroke is a true medical emergency and must be treated as such. If this occurs, pour cool water over the person or apply towels soaked with cold water to help bring the victim's body temperature down, and seek medical help immediately.

Prevention

Heat emergencies can best be prevented if vineyard crew managers follow these guidelines:

Cool, clean water must be readily available and workers encouraged to drink plenty of it on a regular basis. On very hot days, one should drink at least four ounces every half-hour. Refrain from consuming alcoholic and caffeinated beverages, as both will cause more fluid loss through urination.

Take work breaks in the shade or other cool locations if possible. Pour cool water over head, neck and upper body to enhance the body's own moisture and create a cooling effect.

Reschedule heavy and physically-demanding work to a cooler time of the day if possible, or start work earlier in the morning when temperatures are cooler.

At the first signs of a heat emergency *always* take the prudent course: Stop work immediately, and get the person into a cool environment and give them plenty of fluids.

Please, take precautions when working or playing on hot days. Workers should wear light colored hats with brims wide enough to shade the neck and face. Workers with black hair can absorb significant amounts of heat energy. Consider picking white varieties by night with lights. Have managers monitor temperatures, and stop work when temperatures reach threshold limits. ■

Doug Price has a certificate in Workplace Health and Safety from U.C. Davis.

The author thanks Dr. Stephen McCurdy, UC Davis Western Center for Ag Health & Safety for content review.

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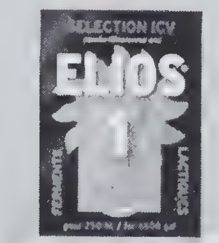

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Wine Librarians preserve history

BY Bo Simons
Sonoma County Wine Library,
Healdsburg, CA

The Wine Librarians Association has been meeting since August 1997 to improve collection, sharing, and dissemination of publications centered on wine.

Wine librarians from the University of California at Davis, California State University at Fresno, Wine Institute (California), Napa Valley Wine Library, Sonoma County Wine Library, Sonoma State University, California State Polytechnic University at Pomona, Napa Valley College, and Cornell University in New York have all been active in the association.

The group started through the efforts of Tammy Lau, archivist and head of Special Collections at the Henry Madden Library, and Axel Borg, viticulture and enology bibliographer, UC Davis. Lau, then new to California and her job at CSU Fresno, provided much of the organizing energy.

Borg hosted the first meeting, where the group discussed sharing resources, keeping each other informed of new collections, sharing articles and duplicate publications, and starting a listserv, website, or gateway. The first meeting included a tour of the UC Davis viticulture and enology collections at the Shields Library and the Department of Viticulture & Enology and its cellars.

Librarians at that first meeting included Debbie Whorton, manager of the E & J Gallo Library in Modesto, Zita Eastman (Sonoma County Wine Library), Clayla Davis (Napa Valley Wine Library), and Barbara Butler (Sonoma State Library).

In 2002, the loosely knit organization formally organized to accept donated funds and publish a book by Roy Brady, longtime friend of wine libraries who died in 1998. A lover of wine and wine books, Brady had gathered one of the finest collections of wine books ever assembled and sold it to CSU, Fresno, in 1968.

In addition to his career as a mathematics professor and consultant, Brady wrote for a number of wine magazines and traveled throughout California and around the world, meeting with wine producers. He also edited *Wine World* magazine in the early 1970s and produced a little gem of a book in 1990, called *Old Wine, Fine Wine?*

Following Brady's death, his friend Tom Pinney, author of *A History of Wine in America* and retired Pomona College English professor, edited a huge file of Brady's unpublished writings into a typescript of several hundred pages.

Another Brady friend, Darrell Corti, Sacramento food and wine merchant and a major wine book collector and wine authority, offered $16,000 to fund the publication of a book based on these unpublished writings. Gail Unzelman, editor of *The Wayward Tendrils Quarterly* and author and publisher (*Wine and Gastronomy* and *The California Wine Association and Its Member Wineries 1894–1920*), oversaw production of the book.

With the help of Julie Dickson, president of the Napa Valley Wine Library Association, the group of wine librarians incorporated, so they could accept Corti's underwriting gift and use the proceeds of the book sales to fund the group's activities.

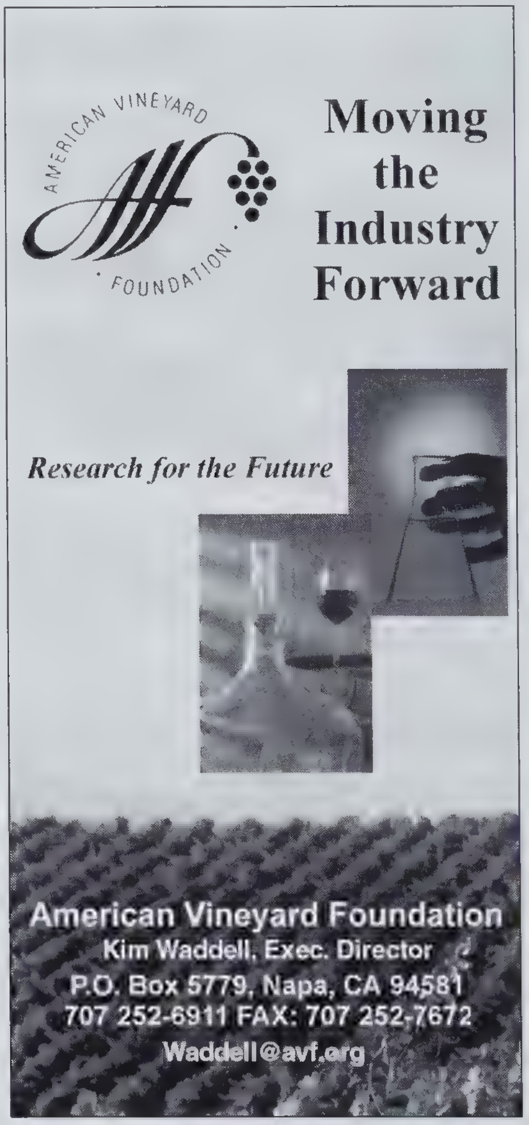
In late 2003, a small edition of 250 copies of *The Brady Book,* was released. It features tipped-in illustrations at $100 per copy and reflects Brady's wide-ranging interests in wine, food, books, collecting, and California wine history. It consists of over 60 short pieces ranging from less than a page to five pages arranged in topics in ten topic categories ("Old California," "Emerging California," "The New California," "Spain, France, Madeira," "All About Wine," "Wine Books," "Judging Wine," etc.)

In October 2004, the Wine Librarians Association celebrated publication with an event at Stony Hill Vineyard in Napa Valley.

The first press run of *The Brady Book* is nearly sold out. (To obtain a copy, contact: Nomis Press, 149 Gray Ct., Santa Rosa, CA 95404, 707/546-1184.) With the income from book sales, the association published a series of wine history books in 2004 based on the research of wine historian Ernest Peninou.

The association is currently determining the best way to use the remainder of this nest egg. Members are exploring several potential project options, such as making available copies of an important early California wine trade magazine, hosting a seminar on wine history and bibliography, or mounting a traveling exhibition about the treasures in wine libraries.

With this brief but flourishing history behind it, the Wine Librarians Association has bright prospects ahead. The group has established an email group on Yahoo at http://groups.yahoo.com/group/winelibrarians/. To join WLA (dues $20) or for further information, contact Secretary Gail Unzelman at WLA, PO Box 9023, Santa Rosa, CA 95405, or email Gail at nomis@jps.net. ■



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PERSONNEL POINT OF VIEW *by Anne Heron*

Keeping the Best

“What can I do now? Suzie quit last week, and I don’t want others to follow!” Joe told me. He is general manager of a mid-size winery. “Now that the economy is picking up, how do I make sure we keep our best employees?”

“Why did she leave?” I asked. “Actually, she never seemed happy here,” Joe explained. “She came to us from Silicon Valley, where she worked in a fast-paced, high-tech firm. She told us she was looking to make a lifestyle change, to slow down, and — how did she put it? — ‘savor life in the wine country.”

“Turns out that she got frustrated by how long it takes us to do things. She rubbed everyone the wrong way. We’re so people-oriented; we really value teamwork and building strong working relationships. We like to spend a bit of time talking about the kids and the weekend at our staff meetings. She just wanted to dive right into business. She seemed like a bull in a china shop a lot of the time.

“So, I’m not too upset that she left. You know, maybe we shouldn’t have hired her in the first place. She’s going to a great job with a local high-tech firm, and I think she’ll be happier there,” Joe sighed. “So it’s all for the best. However, it has me worried about losing other staff. What should I be thinking about?”

Managing for employee retention

“SELECTING THE RIGHT PEOPLE IS THE FIRST STEP IN ANY RETENTION PROGRAM,” I replied. “Sounds like you learned about this with Suzie.” Joe nodded, and we discussed putting a plan in place to find Suzie’s replacement — identifying the competencies needed, paying attention to ‘fit’ with the winery’s culture, and using behavior-based interviews. If employees have the skills necessary to perform their jobs, and they share the values of your organization, they’re more likely to find satisfaction in their work and contribution.

“One of my associates recently helped staff two new tasting rooms, ” I told Joe. “One of the wineries wanted to create an elegant, formal environment. The other was seeking comfort and informality. Out of all the candidates that she considered, none of them was a fit for both organizations, not even the superstars.

“The bottom line is this: You want to hire people who want to work for you, in the position you are hiring them for, in your environment.” Then, once you’ve hired the right person, be sure to integrate them into your organization successfully. Provide them with an effective orientation process. Make them feel welcome, productive, and appreciated.

Let employees know they’re appreciated

“WHAT TYPE OF GROWTH OPPORTUNITIES DO YOU PROVIDE?” I asked. “I recently read a study that the opportunity for growth was the most important factor leading to a high degree of employee loyalty.”

“Yes, I’ve heard that, too,” Joe sounded resigned. “But we’re a small organization, and there are few chances for promotions around here.”

“Growth opportunities can be many things,” I pointed out, “including training, internal job changes, special project assignments, the chance to mentor others, and temporary positions. Small organizations often have more opportunities to expand employee knowledge and exposure to the business, because they’re typically less formal and individuals wear many hats.” Joe smiled, “Now that’s really true around here!”

“WHAT ABOUT COMPETITIVE COMPENSATION AND AN ATTRACTIVE BENEFITS PROGRAM?” Joe asked. “I’ve been concerned about how our package compares with other wineries.”

“That’s an important thing to consider,” I agreed. “There are several salary and benefits surveys available for both the wine industry and the local geographic area. These can provide useful information about what others are doing in your marketplace. In addition to the surveys, you can gather information about trends from recruiting firms or your benefits broker.

“When you want to create a program with a retention focus, you can also ask your employees what’s important to them. I work with one small winery whose owner asked her staff that question during their annual planning retreat. This company was not in a position to make major salary or benefits changes. However, what resulted was a cost-effective benefit improvement that has had a very positive impact and makes the work team feel supported and empowered.

“ONCE YOU DEVELOP YOUR PACKAGE, TAKE STEPS TO LEVERAGE WHAT YOU OFFER,” I continued. Communicate the reason for salary decisions. Let employees know how their pay reflects their value to the organization. If they receive bonuses, tell them what business results or individual performance led to these payout amounts.

Consider creating a Benefits Statement to help educate employees about the value of the benefits they receive. Make sure that your employees understand their benefits, and that they have support within the organization to use them. I have seen many companies put significant resources into generous benefits plans, and then fail to provide the communications, training, and support that are needed for employees to fully appreciate the benefits that are available.

“CONSIDER EXPANDING YOUR DEFINITION OF BENEFITS TO INCLUDE ALL TYPES OF RECOGNITION AND REWARDS,” I suggested. “The study I mentioned before found that recognition and rewards had the second highest impact (after opportunities for growth and development) on employee loyalty. Find out what is really meaningful for your employees. Check your assumptions about what people need and want. It may be more than just money.”

“That’s a great idea,” Joe’s eyes lit up. “I could enlist my employees as problem-solvers. Invite them to help me figure out how our benefits and recognition programs stack up, and ask what they’d like to see be different. This would give them a sense of ownership in our organization. Involving them in this type of process can be a reward in itself!”

“You may be surprised by the simplicity of what they would like. I’ve observed that many organizations fail to provide even very basic acknowledgement and recognition for their employees — a sincere and timely thank you for a job well done. Let your employees know you appreciate them. Be creative.

Ask for an employee critique

"**YOU CAN ALSO ASK EMPLOYEES WHAT'S WORKING IN YOUR ORGANIZATION — AND WHAT ISN'T,**" I continued. "Ask what makes them stay. This can be done with a formal survey or through informal methods, but here's a word of caution: Be careful what you ask for! Asking these kinds of questions creates expectations. You have to be willing to respond to the information employees provide. Use what they suggest, or if you can't implement something, let them know why.

"**CONSIDER THE CULTURE AND MANAGEMENT STYLE YOU'RE BUILDING IN THE ORGANIZATION.**" I reminded Joe of the work he had done with his management team. "The management training classes we conducted for you last year could be seen as part of your retention program. It's been said that employees don't leave their job; they leave their boss.

"You and the leadership team have made great strides in developing a culture that emphasizes open, two-way communication, support, risk-taking, innovation, balance, flexibility, and trust, among other things. By providing training and coaching for your managers and supervisors, you've given them the support they need to create a positive culture for their employees and let them know how important this is to you."

Don't keep your goals a secret!

"**SHARE YOUR VISION OF THE ORGANIZATION'S FUTURE,**" I added. "People want to be part of a winning team. You've done a lot of work on your strategic plan and have a great idea of where you're headed. Share this with your employees on a regular basis. Tell them your goals and how they fit in. People love to make a difference. Let them know how their contribution furthers the company's success."

Joe smiled. "We're planning regular, quarterly 'all hands' meetings. We'll review our progress and then have a short wine education class, so everyone can know how great our products are!"

Joe called several months later to report on results of his employee survey and what new recognition ideas the staff had come up with. "We've got some great things to consider — employee of the month, sommelier classes, and flexible schedules.

"I've also been working with my management team to identify the employees we're most concerned about keeping and creating some individual retention plans for targeted employees." He went on to describe how he was getting everyone involved in creating a purposeful retention strategy for the winery.

"I realize now that some turnover is unavoidable. However, our strategy will help us retain the employees we want to keep. Even more important, we're improving the work environment for everyone. What a win-win."

"That's great Joe," I agreed, "and the improved work environment will help you attract the best new talent, too!" ■

Anne Heron is a Senior Associate with The Personnel Perspective, a human resources consulting, training and recruiting firm in Santa Rosa, California. Anne has over 25 years of management and HR experience. You can reach her at: 707/576-7653.

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SMART VITICULTURE *by Dr. Richard Smart*

California spared from little stinker?

The California wine sector has had its share of problems in the recent past with natural pests and diseases. One friend there quipped to me a few years ago, "Did we offend the gods or something?"

First, there was the collapse of AXR-1 (which some Europeans predicted to be inevitable) due to the purported "new biotype" of phylloxera. (I think this phylloxera biotype was a former resident of New York state who was just as happy to frolic in and destroy vineyards of the west. I believe it was inadvertently imported when local nursery supplies were short. How sad for California!)

Then, the ever-present Pierce's disease was elevated to a potential new "obliteration" status with the possible introduction of the Glassy-Winged Sharpshooter, which has a much greater ability to fly than current "short-range" vectors. Valiant efforts at quarantine appear to be working — we hope forever.

Next problem is the grapevine mealy bug, which seems to have been spread via nursery stock. It is very difficult to control, and while it is not a great threat to yields there has been concern over wine taint.

Now we meet the current threat, which is (thus far) something of a "good news-bad news" story for California. The bad news is that an apparent inadvertent act by U.S. officials decades ago might have introduced another pest, this time a smelly one. But California has been lucky — the pest, so far, has not become established in grapes. The eastern states and Canada were not so lucky, and I will tell here of "the little stinkers" and their impact.

The offending insect, the Multi-colored Asian Lady Beetle (MALB), *Harmonia axyridis*, has recently been moving westward to include California, Oregon, and Washington; in fact, it has been established in Oregon for several years. Will it expand its range and become more prevalent in California grapes?

Biological control (BC)

Host plant resistance (HPR) is a biological control that brings out the green side in all of us. HPR can be used to control pests and diseases without spraying, or with fewer sprays. Surely one of the world's most successful BC stories is that of grafting grapevines to phylloxera-resistant rootstocks, a technique developed in France in the late 1800s and now used worldwide with great success and at little cost.

There have been failures with biological control, however. Sometimes the introduction of new plants or animals can go horribly wrong. We are familiar with many examples in Australia, but one of the worst is introduction of the cane toad to eat pests in Australian cane fields. The toads did not eat the pests. Additionally they did not stay in the cane fields of Queensland and have now spread across Northern Australia, right to Kakadu World Heritage Park. They are also on the move south to Sydney. Native fauna is threatened by the toad's appetite, and in addition, the toads kill animals that prey upon them, thanks to built-in poison glands.

In the U.S., the MALB is one recent introduction where negative "non-target" impacts are beginning to appear. The wine sector is among its many victims.

Multicolored Asian Lady Beetle (MALB)

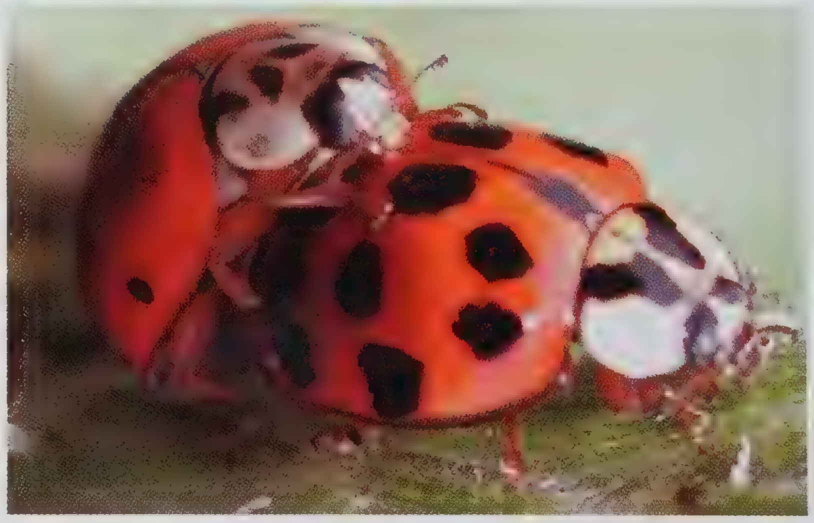
Normally we think of lady beetles as friends, signs of a healthy, low pesticide-use vineyard. Enter MALB, a lady beetle with less than pleasant habits. As its name suggests, the adults are characterized by many different color patterns (with or without spots), but can be recognized by distinctive white and black markings behind the head (see photo).

This little beetle is native to the Far East, and has been introduced to the U.S. and Canada for the control of scale and aphid insects. The first attempts at introduction were actually in California in 1916, and again in the 1960s. These attempts were apparently unsuccessful.

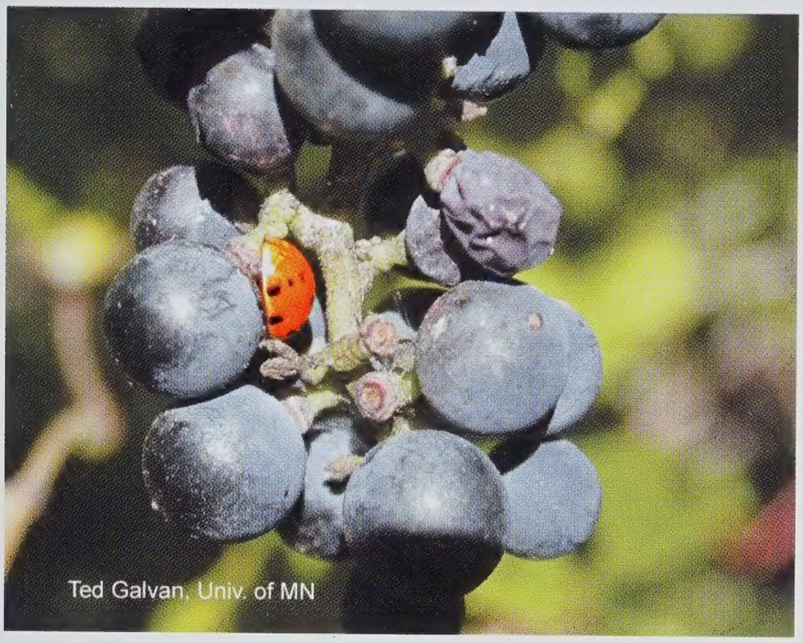
However, MALB was successfully released in Louisiana in 1988. There is debate about whether programmed releases or accidental escape from ships account for the present widespread distribution.

But MALB is now found throughout the eastern seaboard, from Florida to Quebec, from Texas through Missouri, in the central grape growing states of Ohio, Minnesota, Wisconsin, Kentucky, Illinois, Indiana, and in the western states of Oregon and Washington, and in British Columbia (Canada). In brief, MALB is now established across the entire continental U.S., except portions of Montana, Wyoming, and parts of the desert southwestern U.S.

This species is an aggressive feeder and has displaced several native lady beetle species. Food sources such as aphids and scales exist in grain and fruit crops, ornamentals, conifers, and soybeans. MALB is subject to huge population swings, and large numbers in any one summer are due to massive abundance of prey (aphids, scales, etc.) and lack of competition or natural enemies. Females can lay 1,000 or more eggs, and the life cycle is around 30 days, allowing up to three generations per year throughout most of the U.S. So if food is available, MALB becomes quite numerous.



Multicolored Asian Lady Beetles mating. (Photos by Ted Galvan)



MALB on grape cluster.

In the eastern U.S., the MALB seeks a variety of multiple structures, including homes and barns for overwintering sites. Indeed, very large numbers are often found in private homes, facilitating human contact as a nuisance pest throughout the winter months. Before they hibernate, they seek out high carbohydrate food sources like fruit — including grapes.

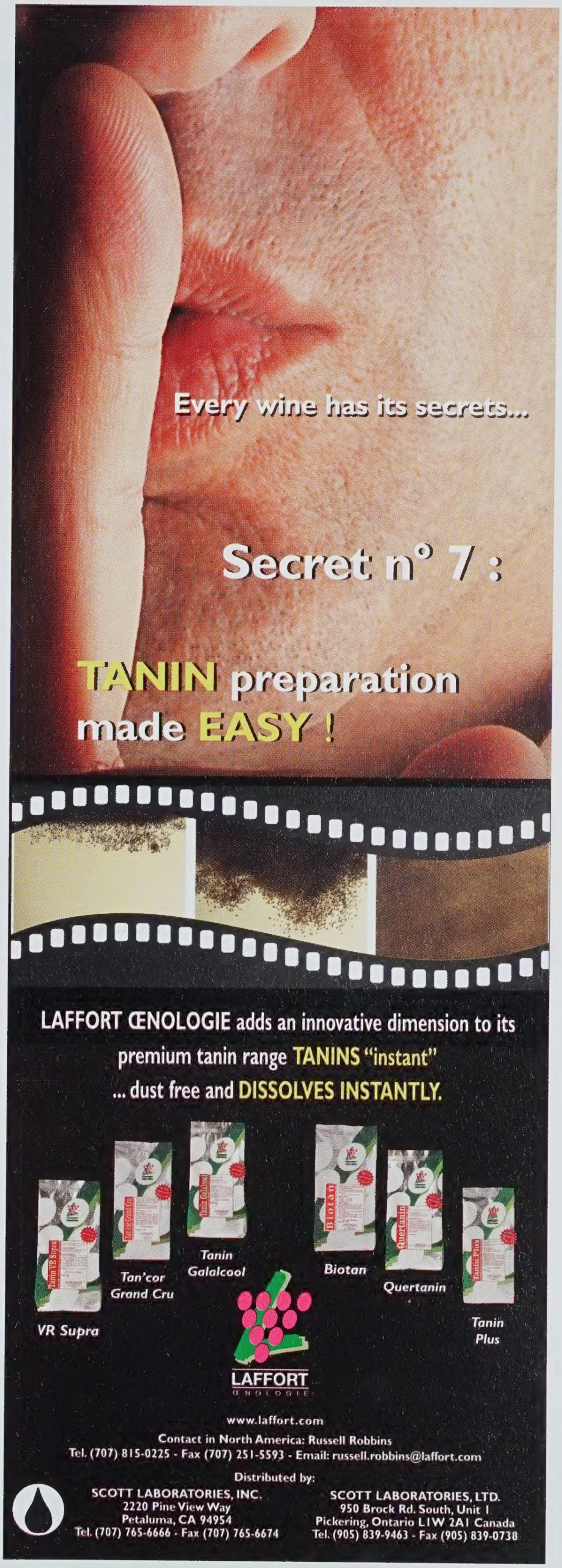
The beetles do have a particularly nasty habit. When threatened, disturbed, or squeezed, they respond by forcing "blood" through their joints, called "reflex bleeding." The yellow orange body fluid has a foul odor, hence its concern to the wine sector. The offensive chemical is of the methoxypyrazine family, known to enologists for being involved in "green" characters of Sauvignon Blanc and Cabernet Sauvignon.

Little stinkers

Imagine this scenario. Near your vineyard is a soybean field replete with many aphids, or some other food source that will attract MALB in hordes. As the soybeans dry down (and are harvested), our lady beetles move on, looking in particular for a "high-carb" diet. You had a little bird damage to your grapes, but suddenly there is a mass of lady beetles in the clusters, right when you are ready to harvest. You begin to pick the beetles out of the grapes, and if that does not stimulate "reflex bleeding," your crusher certainly will.

Then you wonder where the funny wine taint comes from? The sensory impact is that of a musty, nutty, peanut-type odor, while the impact on taste is that of a stringent, peanut-chocolate character. This does not sound too offensive, but these are not grape characters, and many wine consumers find tainted wines unappealing.

How many beetles are required to taint? Dr. Gary Pickering of Brock University (Ontario), suggests that about 0.8 adults per lb. of fruit can result in tainted wine, based on studies with a Riesling wine. Dr. Pickering also indicates that red wines may be more sensitive to the lady beetle taint; this research is on-going. Thus far, most field studies in the eastern states have been conducted on hybrid varieties or those consisting of *V. Riparia* and *V. Labrusca.*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The beetle has caused wine taint problems in many eastern states and Canada. In Minnesota, changes in wines were first noticed in 2001, before the cause of the taint was identified. In 2001, several Ontario wineries had to dispose of a million liters of infected wine. While the threshold is five parts per trillion, some tasters can detect MALB-infected wine that contains two parts per trillion. A tainted wine smells strongly of peanuts but does not represent a health hazard.

No obvious solution

Right now there is no obvious solution to the MALB problem. Vineyard spraying, at the moment, seems ineffective, but research is continuing. Dr. Bill Hutchison and Tederson Galvan (graduate student), University of Minnesota, found that of all insecticides currently registered, carbaryl (Sevin), applied 10 days before harvest, provided significant control of MALB (ca. 84%) compared to untreated check plots. Bifenthrin (Capture) provided 100% control, applied at seven days before harvest, but this product is not currently labeled for this use (only for 30 days pre-harvest). The challenge for the industry is the availability and appropriate use of insecticides, within the labeled pre-harvest interval. None of the tested insecticides affected juice quality (pH, Brix, or titratable acidity).

Many wineries have resorted to hand-sorting clusters and removing beetles, others are using flotation or vibrating-table devices to shake the beetles free. All approaches are currently expensive. Several research groups in eastern states are actively investigating the problem.

Until now, the problem has been sporadic, obviously depending on beetle population density, which in turn can be affected by weather perturbations affecting their food supply. Should the MALB continue to spread further in California, and become established in major wine regions, then I am sure we will hear more about this pesky beetle.

For now, wineries and vineyards in eastern states seem to have a serious problem on their hands. Not to mention the frustrations of millions of home owners forced to co-exist with their unwanted guests.

I want to thank Dr Bill Hutchison of the University of Minnesota for reviewing my text to correct for accuracy, and use of photographs. ■

For more information on MALB, go to: www.vegedge.umn.edu/vegpest/harmonia/harmonia.htm to access "Multicolored Asian Lady Beetle" by R.L. Koch and W.D. Hutchison, Department of Entomology, University of Minnesota.

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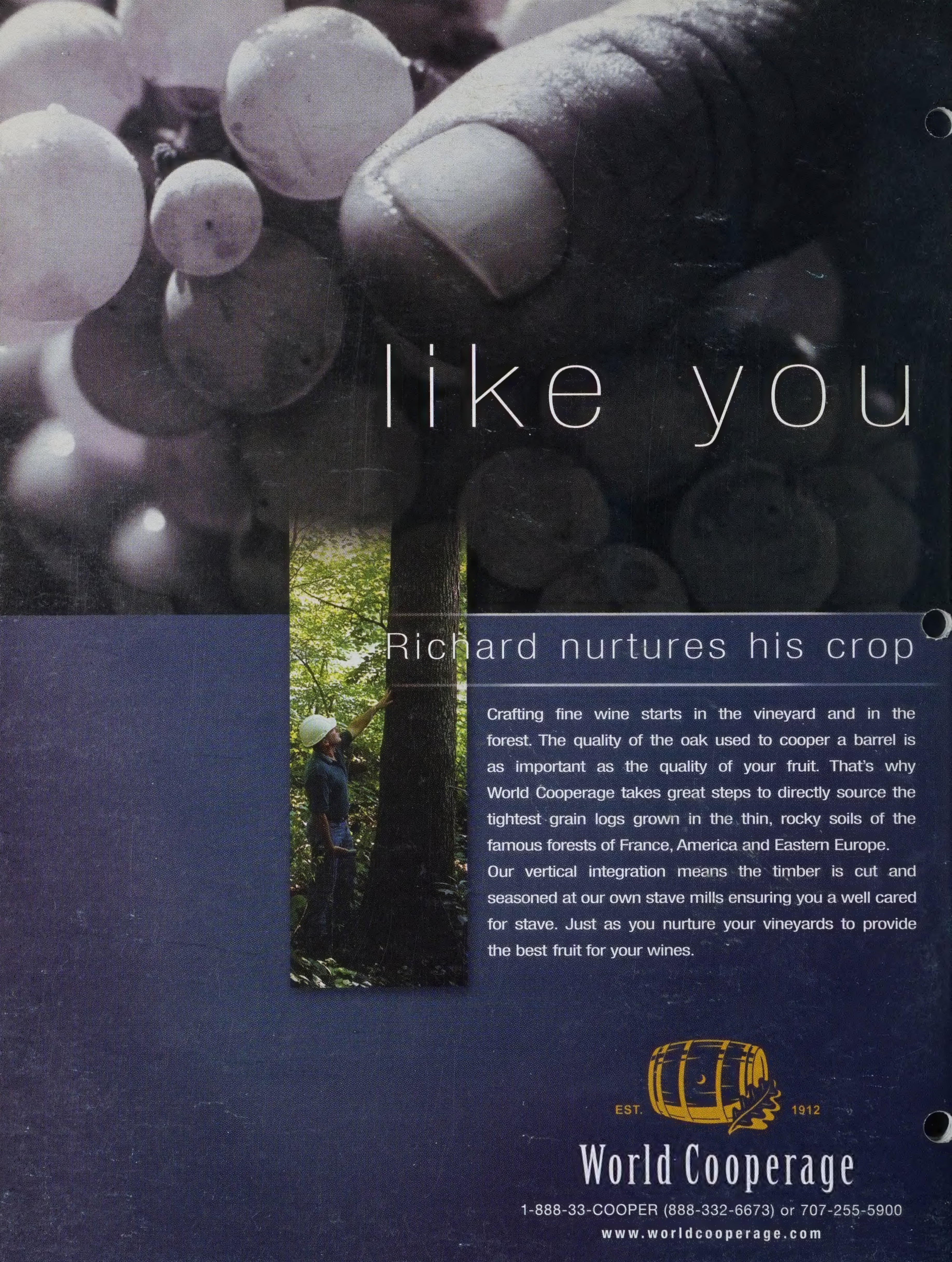

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